

SOUTH INDIAN MUSIC

BOOK V

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సంగీత జ్ఞానమను

బ్రహ్మనంద సాగరమిదని దేహము భూమి భారము ”

(“ అనంద సాగర మిదని ” — గరుడధ్వని రాగము)

“The life spent without swimming in the Blissful
Ocean of Musical Knowledge is a burden to the earth”

Tyāgajñāna, in the Kṛiti *Anandasāgaramīdanī*

(Garudadhvani rāga)

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PREFACE

Indian Musicology is a growing subject Its scope has considerably widened in recent years Topics which have been cursorily dealt with by earlier scholars can now be studied in an intensive and elaborate manner The subject of *rāga lakshana* is an instance in point The *trayodasa lakshanas* or the 13 characteristics mentioned for *rāgas* in earlier works will just give a general picture of a *rāga* As against this we have now the *chatush-shashti lakshanas* or 64 particulars under which we can study the *lakshana* of a *rāga* A study of a *rāga* made from these 64 points of view will give us an analytical, detailed and exhaustive picture of the melodic individuality of the *rāga* In addition, we have now added new topics to the subject of Indian musicology The subjects of *mūrchanākāraka melas*, *amūrchanākāraka melas* and *misra melas* may be cited as examples These subjects are of interest to students of comparative musicology all the world over

Some of the topics dealt with in this volume belong to the realm of pure musicology A few topics relating to the History of Indian Music are also included Portions of some of the Chapters in this book were contributed originally as articles to the *Journal of the Madras University*, *Journal of the Madras Music Academy*, *The Indian Geographical Journal*, *The Educational Review* and the *Silpi* The subjects dealt with in Chapters VII, VIII, X and XI were contributed as Papers to the Sessions of the All-India Oriental Conferences All these Articles and Papers have been amplified and re written in the light of the author's subsequent researches and presented here

CHAPTER 1

MUSIC AND MATHEMATICS

There is an order and rhythm in all things pertaining to Nature. There is rhythm in the movements of the stellar bodies. There is rhythm in the pulse of the hand. In Music, rhythm plays a very important part.

In the history of human race and culture, music happens to be the earliest fine art to be developed. The primordial scale of Indian music though developed without any knowledge of the frequency relationships of notes, was on a later analysis found to take notes of correct and well recognised musical intervals.

Music is an exact science. The student of Mathematics will find herein the practical application of many of the concepts, series, progressions and formulas of mathematics. The popular notion that art is something that will not stand scientific analysis is incorrect. The notes used in the musical systems of all civilised countries bear well-recognised ratios to the fundamental note. Notes not conforming to these values will sound unmusical and unpleasant. Once the tonic note is sounded, the values of all the other notes of the scale get automatically defined. The whole science of music, eastern or western, is based on the fundamental factor of samvādita or consonance.

TONE SYSTEM

The frequencies of two notes which are an octave apart bear the ratio 1 : 2. Thus if the frequency of the middle octave shadja is equal to n vibrations per second, the frequency of the higher octave shadja will be equal to $2n$.

vibrations per second. The frequency of the next octave shadja will be equal to $4n$ vibrations per second (i.e., twice the frequency of its immediate lower shadja) and so on. Thus the frequency relationships of the octaves proceed in geometrical progression 1, 2, 4, 8, 16, 32, etc. This is referred to in early works as the *dviguna character* of the octave notes.

This same progression downwards is seen in the concept of shatkālas or six degrees of speed. Herein the value of a note gets progressively reduced from unit time in the first degree of speed to $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, and $\frac{1}{32}$ nd unit time in the other five degrees of speed. In other words, one note is sung to unit time in the first degree of speed, 2 notes to the same duration in the second degree of speed, 4 notes in the third, 8 notes in the fourth, 16 notes in the fifth and 32 notes in the sixth degree of speed and so on. In the concept of shanmārgas (Dakshina, Vāntika, Chitra, Chitratarā, Chitratama and Ati chitra tama) in the sphere of tāla dasaprānas (10 elements of musical time) also, we see this progression.

The arithmetical progression 1, 2, 3, 4, 5, 6, 7, 8, etc. is seen in the frequency relationships of the svayambhu svaras or the upper partials. These harmonics are heard when a stretched string is sounded. The perception of the consonant note Panchama or the Perfect fifth ($3/2$) constitutes the first landmark in the evolution of the tone system. After the fundamental, the first note in the gamut that was recognised was the Panchama, the third harmonic. The cycles of Fifths and Fourths (or the under Fifths) were logically worked out and the tone system was evolved. It is possible that the study of the harmonic series and the frequencies of the notes belonging to different octaves led

early mathematicians to become cognizant of the arithmetical and geometrical progressions

The notes used within an octave bear certain simple ratios to the fundamental. The notes shadja and panchama (C and G) bear the ratio 2 : 3, the notes shadja and suddha madhyama (C and F) the ratio 3 : 4, the notes shadja and antara gāndhāra (C and E) the ratio 4 : 5, the notes shadja and sādharana gāndhāra (Komal ga or E flat) the ratio 5 : 6 and so on.

Next to the unison and the octave, the Panchama is the most consonant interval. A pleasant effect is experienced when a note and its Panchama are sounded together. The 22 notes used in the Indian musical scale are the earliest notes to be derived in the cycles of fifths and fourths, eleven notes exclusive of the fundamental in the former case and eleven notes inclusive of the fundamental in the latter case. The significance of the inclusion of the note of frequency $40/27$ in the ancient scale, madhyama grāma, will be clear when it is realised that this note occurs as the eleventh note in the cycle of fourths or sa—ma series. The later notes of the cycle are not of interest from the point of view of practical music. In the Table on Page 4, the frequencies of the notes of the two cycles reduced to one octave are given in the increasing order of pitch from left to right. Leaving the two notes shadja and panchama (C and G), it will be found that the remaining 20 notes are distributed amongst the five svaras at the rate of 4 for each. Each note of the cycle of fifths will be found to be a pramāṇa śruti (comma or $81/80$) higher than the contiguous note of the cycle of fourths. The Indian tone system is therefore not only evolved on a consonantal basis but is also logical and mathematically accurate.

	s	r	g	m	p	d	n				
Cycle of fifths	1	$\frac{16}{15}$	$\frac{81}{64}$	$\frac{27}{20}$	$\frac{729}{512}$ or $\frac{64}{45}$	$\frac{3}{2}$	$\frac{8}{5}$	$\frac{27}{16}$	$\frac{9}{5}$	$\frac{243}{128}$	2
Cycle of fourths	1	$\frac{256}{243}$	$\frac{10}{9}$	$\frac{32}{27}$	$\frac{5}{4}$	$\frac{128}{81}$	$\frac{15}{8}$	$\frac{16}{9}$	$\frac{16}{9}$	$\frac{243}{128}$	2

Note — In the above Table, the ratios $\frac{729}{512}$ and $\frac{64}{45}$ differ from each other very slightly, likewise the ratios $\frac{1024}{729}$ and $\frac{45}{32}$. To enable easier calculations, the simpler ratios in both the cases are taken for further progressions,

The very idea of pramāna sruti or comma was perceived when the eleventh note of the cycle of fifths was reached. This note, it may be pointed out, is a comma higher than the perfect fourth. The fifth of this note again revealed a note which was a comma higher than the fundamental.

Thus the use of ten twins of notes in addition to the shadja and panchama, the two notes of each twin differing by the interval of a pramāna sruti or 22 cyclic cents, is the distinctive feature of the Indian tone system.

With the panchama, the madhyama was automatically perceived, since the madhyama was only an under fifth. In other words, if of two notes which are related as shadja and panchama, the higher of the two notes is taken as the fundamental, the other note will be found to be the suddha madhyama of the lower octave. Thus the cycle of fourths is implied in the cycle of fifths. The values obtained by the downward (anti clockwise) progression of the cycle of fifths will be the same as the values obtained in the upward (clockwise) progression of the cycle of fourths. Conversely the values obtained in the downward (anti-clockwise) progression of the cycle of fourths will be the same as the values obtained in the upward (clockwise) progression of the cycle of fifths.

It may be pointed out incidentally that in some rāgas, notes other than the 22 are used, but such notes differ from the neighbouring notes of the scale of 22 srutis by such a microscopic interval that they are justifiably enough regarded as reflections or lustuous varieties of the contiguous notes.

The idea of 22 notes being distributed among the sapta svaras is in keeping with the ratio $22/7$ or π — the relationship between the circumference and the diameter of a circle,

After the panchama and madhyama, the next note of the gamut to come to the notice of man was the fifth harmonic, antara gāndhāra $5/4$. This note also formed the basis of a new cycle—the cycle of thirds. Thus the major third of major third is equal to $5/4 \times 5/4 = 25/16$. The panchama lower down of this note $25/16$, is $25/24$ or the nyuna sruti interval (small semitone). The kampita rishabha of Saurāshtra rāga is suggestive of this note. Only a few notes of this cycle are however of practical importance.

SCALES OF EQUAL TEMPERAMENT AND JUST INTONATION

In the scale of equal temperament, the successive notes of the gamut form a perfect geometrical progression. They are separated from their neighbours by the same common interval. Any two adjacent notes of the scales of 12 semitones will be found to bear the ratio 1 : 1.05946. In Indian music it is the scale of just intonation that is used. The notes used in Indian music are the acoustically correct ones. In the equal tempered scale which became a necessity in Europe on account of the scheme of harmony, the frequencies of the notes, except for the fundamental and the octave, are either slightly below or above their true ratios. The difference in the frequencies of the notes in the two systems of tuning is, no doubt, very slight but nevertheless it is a solid and a real difference and can be perceived by a trained ear.

It may be of interest to note in this connection that the notes that figured in the old scale, shadja grāma, were described in terms of sruti values thus —

s	r	g	m	p	d	n
4	3	2	4	4	3	2

four standing for the major tone ($9/8$), 3 for the minor tone ($10/9$) and 2 for the semitone ($16/15$) In the other old scale ma grāma, the interval between the fourth and the fifth was a minor tone The *murchhana* of this ma grāma corresponds to the major diatonic scale of European music

Every interval used in an octave has its complementary interval and the sum of these two intervals is equal to the frequency of the octave, i e , 2 The frequency of *panchama* $= 3/2$ If the *panchama* is taken as the tonic note and the *shadja* above this played, the latter note will impress one as the *suddha madhyama* Thus the octave is made up of the two intervals, perfect fifth and perfect fourth, i e , $3/2 \times 4/3 = 2$ The difference between the two intervals *panchama* and *madhyama* is a *chatussuti* interval or major tone $3/2 - 4/3 = 9/8$

There are three ways of expressing the values of notes —

(1) In terms of vibrations per second , For ex , the frequency of the middle octave *Sa* = 256 vibrations per second.

(2) In terms of ratios to the fundamental , For ex , the value of *antara gāndhāra* $= 5/4$, *Sa* being equal to 1

(3) In terms of cents , ex , *panchama* = 702 cents (In this calculation, the octave is divided into 1,200 cyclic cents) The calculations herein are worked out on a logarithmic basis

A study of musical intervals reveals the following —

(1) If of two intervals making up an octave, one happens to be a consonant (*samvādi*) interval, its complementary interval also is a consonant interval, thus the,

panchama and suddha madhyama — the perfect fifth and the perfect fourth ($3/2 \times 4/3 = 2$) are both consonant intervals

(2) If of two intervals making up an octave one is a dissonant (vivādi) interval, its complementary interval also will be a dissonant interval, thus suddha rishabha (D flat) and the kākali nishāda (B) $1\frac{1}{5} \times 1\frac{1}{5} = 2$ are both dissonant intervals

(3) If of two intervals making up an octave, one is an anuvādi interval, i.e., neither consonant nor dissonant, its complementary interval will also be an anuvādi interval, thus antara gāndhāra (E) and suddha dhaivata (A flat) $5/4 \times 8/5 = 2$ are both anuvādi intervals

The major chord of European music is a triad wherein the frequencies of the three notes bear the relationships 4 5 6 i.e., 1, $5/4$ and $3/2$. The minor chord of European music is a triad whose notes bear the frequencies 1, $6/5$ and $3/2$

The panchama or the perfect fifth itself is the arithmetical mean of the fundamental and its octave $\frac{1+2}{2} = \frac{3}{2}$

The antara gāndhāra (E) is the arithmetical mean of the notes, shādja and panchama $\frac{1+\frac{3}{2}}{2} = \frac{5}{4}$. The chatussruti rishabha is the arithmetical mean of the notes, shādja and antara gāndhāra $\frac{1+\frac{5}{4}}{2} = \frac{9}{8}$

SCALES

The 12 semitones used in an octave are universally known. With these 12 notes as the basis, 72 heptatonic scales have been evolved, 36 of these scales take the suddha

madhyama or F Natural and 36, the prati madhyama or F sharp. The number 36 is the square of 6. Leaving aside the graced utterances of notes in rāgas, it may be pointed out that the melodic individuality of a rāga is established by using in it notes of defined frequencies in relation to the fundamental. If due to carelessness, a note of faulty pitch is sung, that note will sound as an *apasvara* and give a rude shock to the sensitive listener. The melodic entity of the rāga will be also affected by such careless singing.

All the 72 heptatonic scales mentioned above take the perfect fifth. By substituting F sharp for the perfect fifth in the first 36 melas, the number 72 can be increased to *108. All these are homogeneous scales in the sense that in every scale the notes taken by the ārohana (ascent) occur in the avarohana (descent) as well. In the scheme of 144 (the square of 12) scales, the first 72 comprise the present melas. The next 36 consist of a suddha madhyama mela in the ascent and its parallel prati madhyama mela in the descent. In the next 36, it is the other way about—a prati madhyama mela in the ascent and its parallel suddha madhyama mela in the descent. In the scheme of 5,184 (square of 72), suddha--misra melas, there are the 72 chakras or sections, comprising 72 scales each. In each section, the ascending scale is a constant factor and the descending scale progressively varies from the melas of serial numbers 1 to 72. In the scheme of

*These extra 36 melas are known as the *Vikrita Panchama melas*. In these melas, the purvanga and uttaranga notes recur in the same order as in melas 1—36 but there is no Panchama. The suddha madhyama and prati madhyama occur in both ascent and descent and the prati madhyama is intended to be sung with the letter *pa* i.e. this prati madhyama becomes a *Vikrita Panchama*.

suddha misra melas comprising the 72 homogeneous melas and the 5112 heterogeneous melas, the serial number of any one of the present 72 melas is found by the formula,

$$72(n-1) + n$$

where n = the serial number of the melakarta in the scheme of 72. The melodic minor scale of European music is a heterogeneous scale and its rank in the scheme of 5,184 suddha-misra melas is, 1604

TRANSILIENT SCALES

In addition to the above heptatonic scales, Indian music employs a large number of transilient scales. These scales eschew a note or two in the ascent or descent or in both. The total number of transilient scales is 34,776. This number, colossal as it is, does not include the svarāntara rāgas which take only 4 notes either in the ascent or descent or both. Nor does this number include the bhāshāṅga rāgas and the vakra rāgas. Thus the statement that the number of rāgas is 'infinite' is practically true.

The total number of svarāntara rāgas that is possible is 92,160. Just as the possible shāḍava combinations are 6 and audava combinations are 15, the possible svarāntara combinations are 20. The number 20 is got by deleting the following notes —

- | | |
|-----------|------------|
| (1) n d p | (6) d p g |
| (2) n d m | (7) d p r |
| (3) n d g | (8) p m g |
| (4) n d r | (9) p m r |
| (5) d p m | (10) m g r |

(11) n p m	(16) p g r
(12) n p g	(17) n m g
(13) n p r	(18) n m r
(14) d m g	(19) d g r
(15) d m r	(20) n g r

Svarāntara - sampurna rāgas are	20
Sampurna - svarāntāra „ „	20
Svarāntara - shādāva „ „	120
Shādāva - svarāntara „ „	120
Svarāntara - audava „ „	300
Audava - svarāntara „ „	300
Svarāntara - svarāntara „ „	400
	<hr/>
	1,280
	<hr/>

Since in each mela, all these combinations are possible, the total number of svarāntara types of rāgas for the 72 melas comes to $1,280 \times 72 = 92,160$. This added to the 34,848 heptatonic and transilient scales (exclusive of the bhāṣhāṅga rāgas and vakra rāgas), will yield the number of rāgas as 1,27,008 (*N B*—About a fifth of this number of rāgas will be found to repeat in one or more melas). Two of the well-known svarāntara rāgas are Navarasakannada and Vivardhani. By using a formula similar to that of the *Nashtoddhishta*, given a number we can find out the form of the ārohana and avarohana and the janaka mela of the rāga represented by the number. Likewise given a rāga or a rāga's ārohana and avarohana and janaka mela, we can find out its serial number.

GRAPHS

The svaia graphs of rāgas present an interesting study. They not only define the contour of the ragas but also throw light on the nature of their ārohana and avarohana, their heptatonic or transilient character, their vakra or kiama character, the vakia svaia, vakīāntya svaia and the extent of vakiatva, jantī svaia, dīgha svaras and kampita svaia if any, the amsa svaras, nyāsa svaia (major nyāsa and minor nyāsa inclusive) and the notes on which one can rest and develop an ālāpana. The svaisthāna graphs and the śrutisthāna graphs of rāgas throw further light on the frequencies of notes used in the rāga. The svaisthāna-graphs also reveal if the lower and upper tetrachords are symmetrical or otherwise (Also see Chapter vi of the Author's book "Teaching of Music")

It will be of interest to note that melas with pairs of symmetrical tetrachords are six in number and they occur in the purva group. Their serial numbers happen to be in the following series —

1	=	Kanakāṅgī
1+7	= 8	Hanumatodī
1+7+7	=15	Māyāmālavagaula
1+7+7+7	=22	Kharaharapriya
1+7+7+7+7	=29	Dhīrasankarābharana
1+7+7+7+7+7	=36	Chalanāta

In all the suddha madhyama melakartas, there is the interval of a major tone between the terminal note of the lower tetrachord and the initial note of the upper tetrachord. In the prati madhyama melakartas there is the interval of a semitone between the terminal note of the lower tetrachord and the initial note of the upper tetrachord.

RHYTHM

In the sphere of rhythm, the numbers 4 and 3 play a great part. Their sum represents the number 7 which is the total number of *svaia*s and the total number of principal *tālas*. The product of the numbers 4 and 3 is twelve which is the number of *svaia*sthānas or semitones in an octave and whose multiples are represented in the number of *melas* (72), *talas* (108) etc.

The 7 principal *tālas* admit of 35 varieties, on account of the five varieties of *laghu* *trīśra* (3), *chaturasra* (4), *khanda* (5), *misra* (7) and *sankīrṇa* (9). The *laghu* also admits of another five varieties named *divya laghu*, *simha laghu*, *vaiṇa laghu*, *vāḍya laghu* and *karnāṭaka laghu*. Their time-values are 6, 8, 10, 12 and 16 counts respectively. This gives us another 35 *tālas*. Each of these 35 or 70 *talas* again admits of 5 varieties on account of the *gati bheda*, i.e., division of each count into 3, 4, 5, 7, or 9 minor units of time. This gives us in all 175 or 350 *talas*.

In addition there are —

(1) The classical 108 *tālas* making use of all the *śadāṅgas*. The aforesaid 350 *tālas* make use of only the three *āṅgas* *anudrutam*, *drutam*, and *laghu*.

(2) *Tālas* like *Sarabhanandanam* employing most of the *śodasāṅgas*.

(3) The *deśāḍi*, *madhyāḍi*, *druva rūpaka* and the *chāpu talas*.

(4) Innumerable folk time-measures of mixed pattern,

In the four varieties of the chāpu tāla, the existence of the following series may be noted —

1+2=3, Trisra chāpu

2+3=5, Khanda chāpu

3+4=7, Misra chāpu

4+5=9, Sankirna chāpu

Note --In the misra chapu tāla, the recurrence 3+4 is the normal thing; but Syāma Sāstri has composed many pieces wherein the reversed scheme of 4+3 is noticed

Compositions like the sapta tāla gita are of special interest. The length of the composition herein is such, that seven different people counting seven different talas and starting to reckon simultaneously with the music, will be found to finish with a whole number of āvartas. There is the celebrated sapta tāla gita in Nāṭya rāga, beginning with the words "*Gāna vidyā dhurandhara* ". The length of the composition = 30 āvartas of Dhruva tāla (chaturasra jāti) or 420 aksharakālas. When the gita is sung once, it will be found that,

- (1) the person reckoning Matya tāla (chaturasra jāti) has completed counting 42 āvartas
- (2) the person reckoning Rupaka tāla (chaturasra jāti) has completed counting 70 āvartas
- (3) the person reckoning Jhampa tāla (misra jāti) has completed counting 42 āvartas
- (4) the person reckoning Triputa tāla (trisra jāti) has completed counting 60 āvartas
- (5) the person reckoning Ata tāla (khanda jāti) has completed counting 30 āvartas
- (6) the person reckoning Eka tāla (chaturasra jāti) has completed counting 105 āvartas.

Anuloma and Pratiloma expositions, when attempted for pallavis whose āvartas consist of an odd number of aksharakālas will prove very tough. A pallavi in sama tāla consisting of 13 aksharakālas for an āvarta has to be compressed and sung to the duration of $6\frac{1}{2}$ and $3\frac{1}{2}$ aksharakālas respectively in the anuloma stage.

The players of tāla vādyas should be clever specially in calculation. When confronted with intricate pallavis from their principals, they should be able to start their crowning conclusions (tirmānas) from the correct fractional point in the āvarta so that they will be able to finish correctly and lead the principal in singing the pallavi.

A purely melodic system of music like the one in vogue in India affords scope for the development of certain musical concepts which are either unknown to other systems of music or do not contain the requisite atmosphere for the development of such concepts. The concept of tāla dasa prānas or the ten elements of musical time is an instance in point. To take only the last element of prastāra, all the possible types of permutations and combinations both of the finite and infinite varieties have been attempted here. There are the prastāyas pertaining to svara, rāga, mela and tāla. Some of them though not of interest from the point of view of practical music are nevertheless contributions to pure knowledge on the subject. The prastāyas have in each case been classified, named and worked out in full detail. *Khanda prastāra* signifies that the possible number of permutations and combinations is a definite number, whereas *Akhanda prastāra* signifies that the number is practically limitless.

The *prastāras* are developed according to a plan Angas that recur should be of a progressively diminishing magnitude This plan enables one to determine the nature and structure of a phrase, if its serial number is given and to determine its serial number if the phrase is given

The *svara prastāras* are a finite number

The possible combinations with 2 notes are only 2

„	3	„	.	6
„	4	„	..	24
„	5	„		120
„	6	,		720
„	7	„	.	5,040

The 5,040 *svara* phrases are of the *sampurna* pattern and the rest of the *asampurna* pattern

In the sphere of rhythm, there are

- (1) the *chaturanga prastāra*, employing the 4 angas laghu, guru, plutam and Kakapadam
 - (2) the *shadasnga prastāra*, employing all the six angas, i.e. the anudrutam and drutam in addition to the above four
 - (3) the *shodasānga prastāra*, employing all the 16 angas from the anudrutam to the Kākapādam
- The total number of *prastāras* herein will run to some millions

Graphical representation of these *prastāras* result in interesting geometrical figures

In *nruttam* or pure dance, the varied aspects of rhythm involving calculations of a complicated nature find full application

In music the numbers 4 and 3 and their sum (7) and product (12) and squares 16 and 9 play a very large part

MUSICAL INSTRUMENTS

The shape and construction of resonators of musical instruments offer a fascinating study from the point of view of plane geometry and solid geometry. The hemispherical resonator of the vina, the bucket-shaped resonator of the svarabat, the cylindrical resonator of the pambai, the elliptical mouth-hole of the European flute, the convex-shaped belly of the tambura, the octagonal-shaped resonator of some rare tamburas, the conical drums, the conical bore of the nāgasvaram, the cylindrical bore of the Indian flute and the trapezoid resonator of the svaramandala offer interesting study. The horn plectrum used for playing plucked instruments is of the shape of an isosceles or equilateral triangle.

The parallel strings of the harp and the piano, the parallel fiets of the svarabat, the parallel tubes of the organ and the pan pipes, the straight fiets of the vinā contrasted with the curved fiets of the sitār, the series of interspaces between the 24 frets of the vinā presenting a series of rectangles of progressively diminishing breadth from the region of the neck to the belly, all deserve notice. In the vinā, the length of the dandi or stem bears to the circumference of the resonator a definite ratio

Again the cylindrical resonator of the tuntina and the guitar, the cylindrical frame of the kanjira, the barrel-shaped resonator of the mridanga, the mortar-shaped resonator of the timila, the concentric rings of skin on the right face of the mridanga, the various figures into which particles of sand strewn on drum-heads of the panchamukha vadyam arrange themselves for particular strokes, the straight stick and the bent stick used in playing drums, the disc of the drum suriyappai, contrasted with the disc with a chord portion cut off in the drum chandrapirai, the kuzhi talam—குழிதாளம் (tinkling basin cymbals), representing a section of a hollow sphere, the villadi vadyam representing the chord of a big circle and the arched bow of the primitive rāvanāstram deserve attention. The acute angle between the string and the stem of the tuntina, the acute angle between the resonator and the arm of the ancient yāzh (யாழ்), the obtuse angle formed between the face of the performer and the flute, while in the act of playing and the horizontal and perpendicular pegs of the tambura are worthy of note.

The circular shape of the semakkalam (gong) and gramophone records, the hollow oval shaped rings of the pujāi kai-silambu, the semi circular construction of the auditorium of an opera house and the rectangular shape of concert halls are also worthy of notice.

When asked to perform solo displays for tālas in inconvenient tempos, the mridangam players will be found cleverly to retard or accelerate the tempo till they reach the point of easy negotiability. The poor singer or the principal performer will be helpless on such occasions and he will be

obliged to fall in line with the tempo of his rhythmic accompaniment

In the mridanga, chenda and other two faced drums, the pitch of the two heads will be either identical or will bear the ratio 1 2 or 2 3

In some brass wind instruments, some of the notes are produced by artificially increasing and decreasing the length of the air column, i.e., by moving up or down the sliding tube. The speaking length of the air column is also regulated in some wind instruments by manipulating keys. In either case, the length of the air column resulting after the increase or decrease will be found to conform to definite ratios.

A sound that is generated proceeds in expanding spherical waves. The kampita gamaka is an oscillation of pitch between a maximum and a minimum limit. The ekkālam when blown presents an interesting example of a tone progressing along two dimensions, pitch and intensity, simultaneously.

The graphical representation of gopuchcha yati, srotovaha yati, damaru yati, mridanga yati, and vishama yati will present interesting geometrical figures. When on the face of a mridanga, flour or fine particles of sand are strewn and different types of rhythmic strokes played, the particles will be found to rearrange themselves into interesting patterns of figures. Schladnis figures furnish a parallel to this.

MNEMONICS

In coining the nomenclatures for melas, chakras, svaras, srutis and talas, full use has been made of the katapayādi

formula and the bhuta sankhya. The application of these mnemonical devices is seen in many other Indian arts and sciences. The necessity for katapayādi prefixes to mela names arose only after the scheme of 72 melas was enunciated. Names for unnamed melas conforming to the katapayādi formula were likewise coined after the scheme of 72 melas was worked out.

GENERAL

The numbers 5 and 9 also play a large part in the sphere of music. Group kūtis like Pancharatnas and Navaratna mālīkas consist of 5 and 9 compositions respectively. The frequently used rhythmic phrase *ta dhin gi na tom* consists of 5 rhythmic syllables. The stringed instruments of Europe of the violin variety are tuned in fifths. In India, the stringed instruments are tuned in fifths and fourths.

The comma of Didymus or the small interval $81/80$ (pramāna sruti) was known even in the days of Bharata (4th century B. C.). This was the interval that separated the frequencies of the reduced panchama string of the *ma gīama vīna* and the perfect panchama string of the *sa gīama vīna*. The Greek limma is the pūrṇa sruti interval, $256/243$. The Pythagorean scale is represented by the notes used in the avarohana of the Devagāndhārī rāga.

The major tone ($9/8$) is the interval between the 8th and the 9th harmonic and the minor tone, the interval between the 9th and the 10th harmonic. Notes with frequencies of septimal ratios $7/6$, $7/5$ and $7/4$ are possibly met with in some ragas.

A melody has one dimension whereas a harmonised melody has two dimensions. Melodic music is therefore styled horizontal music and harmonic music vertical music. Such concepts in European music as parallel octaves and parallel fifths, and the movements of parts in parallel, oblique and contrary motions deserve attention. The infinitesimal concept of time is seen in the term *Kshanam* in the *tāla* *dasa pīānas*.

Problems involving a lot of mathematical thinking are also possible in music. Two such specimen problems are given below —

1 Sing *s r g m p d n s - s n d p m g r s* only once, at the same time covering all the four degrees of speed in succession. Indicate the manner of singing in notation.

2 Assuming that ten vidvans are drafted to count ten different *tālas*, suggest the name of a song which one can sing and wherein one can find at the conclusion that all the vidvans had finished counting a whole number of *āvartas*. Name the ten *tālas* that you would assign to them and point out the total number of *āvartas*, that each would have reckoned at the end. Point out also the number of times that the initial beats of the *tālas* of all the ten vidvans would have synchronised. (A *pallavi* may be suggested in the place of a song and in this case the *pallavi* may be given in notation and the total number of *āvartas* covered by the *sangatis*, *niraval*, *anuloma* and *pratiloma* and *kalpana svaras* may be indicated separately).

CHAPTER II

EARLY EXPERIMENTS IN MUSIC

Much of the knowledge that we owe at present regarding the nature of scales and srutis (quarter tones) is due to the experiments in music carried out by scholars in ancient and medieval times. These experiments performed with great care and accuracy led them to perceive the beauties of the scale of just intonation and the frequencies of subtle srutis. The early perception of the highly concordant notes, panchama ($3/2$ or 702 cents) and madhyama ($4/3$ or 498 cents), led them to work out the cycles of fifths and fourths to their logical conclusions. Although the cycle of fourths is implied in the cycle of fifths, the fourth (Suddha Madhyama) being an inverted fifth (Panchama) from sa, still it was found useful to work out the series of fourths as well. The knowledge of the 22 srutis was obtained by working out these two cycles. The scale of equal temperament, which became a necessity in Europe on account of the exigencies of harmony, was unknown in India.

Cycle of fifths or *Spiral of fifths* means a series of fifths or panchama svaśas. (The panchama svaśa is the third harmonic note and next to the octave is the most consonant interval). In this process, the fifth of each note of the cycle is taken as the tonic note and its panchama determined; the relation of the new panchama to the original tonic note, shadja is determined. For instance, with the middle octave shadja as the starting note, we find its fifth is

the panchama of the same octave, frequency $3/2$ Taking this panchama as shadja, its fifth is found to be $3/2 \times 3/2 = 9/4$ or the Chatussruti rishabha of the t̄ara sthāyī The fifth or panchama of this note is found to be $9/4 \times 3/2 = 27/8$ or Chatussruti dhaivata of the tara sthāyī The fifth or panchama of this note is found to be $27/8 \times 3/2 = 81/16$ or the Chyuta madhyama gāndhāra of the ātī tara sthāyī and so on The process was continued till the 12th cycle in each case when it was found that the 12th note of the cycle in one case and the 11th and 12th notes of the cycle in the other were higher or lower than shadja or panchama by the small interval of a comma or pramāṇa sruti These notes were ignored as not being of practical importance and the remaining 22 notes were retained and these are the 22 srutis of the ancient Indian scale The further notes obtained in the two cycles were only of academic interest, since all the notes, important from the point of view of practical music, were already obtained

In the accompanying table, all the notes marked on the right of the thick central line, belong to the cycle of fifths and those marked on the left, to the cycle of fourths The roman numerals indicate the order in which the several notes occur in the cycles of fifths or fourths All compound intervals arrived at in working out this process are reduced to the middle octave for the purpose of easy comparison, the precise octave of the note, however, being indicated in notation against each note In the scale of equal temperament, the octave is divided into 1200 equal parts or cyclic cents and each semitone comprises 100 cents The illustration visually shows the points of difference in the frequencies of the notes belonging to the scales of just intonation and equal tempera-

ment Since none of the notes of the scale of equal temperament are used in Indian music, the unsuitability of the harmonium and other fixed-toned instruments (tuned to the scale of equal temperament), for playing correct Indian music is obvious The limitations of the uncultivated human ear being what they are, it is too much to expect the average person to perceive the refined distinctions in the frequencies of the notes belonging to the two scales, but nevertheless these distinctions are solid and aesthetic facts

Most of the conclusions arrived at by ancient scholars can be proved by modern methods The beauty and symmetry underlying the scale of 22 srutis is clear from the illustration There are the ten pairs of notes and these with the *sa* and *pa* give the 22 srutis of the Indian musical scale The two notes constituting each pair are found to be uniformly separated by the interval of a comma or *pramāna* sruti The interval of a comma though small, is still recognisable by the trained ear Of the ten sets of twin notes, the note of the lower pitch belongs to the cycle of fourths and the note of the higher pitch to the cycle of fifths and this is naturally so, since *ma* is a note less in pitch compared to *pa* At the sixth stage of each cycle, a small but negligible correction of 2 cents is introduced to facilitate easy calculation In the cycle of fifths, two cents are subtracted and in the cycle of fourths, two cents are added All these delicate srutis are the pride and glory of Indian music and are carefully treasured up in the compositions of great composers

Not used 160/81 1178 XII—
 N 15/8 Kakali ri 1088 VII—
 N 16/9 Bhairavi ri 995 II—
 D 5/3 Trisruti dha 884 IX—
 D 128/81 Ekasruti dha 792 IV—
 Not used 40/27 680 XI—
 M 1024/729 or 45/32 Prati
 ma 588 or 590 VI—
 M 4/3 Suddha ma 498 I—
 G 5/4 Antara ga 386 VIII—
 G 32/27 Bhairavi ga 294 III—
 R 10/9 Trisruti ri 182 X—
 R 256/243 Gaula ri 90 V—

sa —1200
 —V 1110 Chyuta shadja ri
 —1100 ~~243/128~~ N
 —X 1018 Kaisiki ri 9/5 N
 —1000
 —III 906 Chatussruti dha 27/16
 —900 D
 —VIII 814 Suddha dha 8/5 D
 —800
 —I 702 Panchama 3/2 P
 —700
 —VI 612 or 610 Chyuta pa
 —600 729/512 or 64/45 M
 —XI 520 Begada ma 27/20 M
 —500
 —IV 408 chyuta madhyama ga
 —400 81/64 G
 —IX 316 Sadharana ga 6/5 G
 —300
 —II 204 Chatussruti ri 9/8 R
 —200
 —VII 112 Suddha ri 16/45 R
 —100
 —XII 22 81/80 (Not used)

Two other methods of determining the notes occurring in the cycles of fifths and fourths are given below —

1 *Cents method* Take madhya shadja as equal to 0 Its Panchama will be equal to 702 cents The Panchama of this Panchama is got by adding 702 to 702 The result is 1404 and this is a compound interval or a note in the tāra sthāyī By subtracting from this 1200, the total number of cents for an octave, we get 204 which is the value of the note in the madhya sthāyī. This is the chatussruti rishabha By adding 702 to it, we get 906 cents which is the frequency of the chatussruti dhaivata and so on

For the cycle of fourths, add 498 in each case and proceed as mentioned above

2 *Arithmetical method* The octave consists of 22 srutis The panchama has 13 srutis and suddha madhyama 9 ($13+9=22$) Take madhya shadja as equal to 0 Its panchama is the 13th sruti The panchama of this panchama is got by adding 13 to it The result is 26 and this is a compound interval or a note in the higher octave By subtracting 22 from it (the total number of srutis in an octave) we get 4 which is the value of the note in the madhya sthāyī This is the chatussruti rishabha. By adding 13 to it, we get the value 17 which is the sruti value of the chatussruti dhaivata and so on

For the cycle of fourths add 9 srutis in each case and proceed as mentioned above

The Tables on pp 28-29 give the values of the notes of the cycles of fifths and fourths worked out in the above two methods. Corresponding to a reduction of 2 cents in the sixth cycle in the cycle of fifths, a reduction of one sruti is made in the arithmetical method, likewise an addition of one sruti is made, corresponding to an addition of 2 cents in the sixth cycle in the cycle of fourths. The reasons for this subtraction and addition have already been explained on p 24

CYCLE OF FIFTHS

No of the cycle	Basic note	Resulting note	Value in cents	Value in sruti number
1	<i>sa</i>	<i>pa</i>	702	13
2	<i>pa</i>	chatussruti <i>ri</i>	$702 + 702 = 1404 - 1200 = 204$	$13 + 13 = 26 - 22 = 4$
3	chatussruti <i>ri</i>	chatussruti <i>dha</i>	$204 + 702 = 906$	$4 + 13 = 17$
4	chatussruti <i>dha</i>	chyuta madhyama <i>ga</i>	$906 + 702 = 1608 - 1200 = 408$	$17 + 13 = 30 - 2 = 28$
5	chyuta madhyama <i>ga</i>	chyuta shadja <i>ni</i>	$408 + 702 = 1110$	$8 + 13 = 21$
6	chyuta shadja <i>ni</i>	chyuta <i>pa</i>	$1110 + 702 = 1812 - 1200 = 612$ or 610	$21 + 13 = 34 - 22 = 12$ or 11
7	chyuta <i>pa</i>	suddha <i>ri</i>	$610 + 702 = 1312 - 1200 = 112$	$11 + 13 = 24 - 22 = 2$
8	suddha <i>ri</i>	suddha <i>dha</i>	$112 + 702 = 814$	$2 + 13 = 15$
9	suddha <i>dha</i>	sādhārana <i>ga</i>	$814 + 702 = 1516 - 1200 = 316$	$15 + 13 = 28 - 22 = 6$
10	sādhārana <i>ga</i>	Kaisiki <i>ni</i>	$316 + 702 = 1018$	$6 + 13 = 19$
11	Kaisiki <i>ni</i>	Begada <i>ma</i>	$1018 + 702 = 1720 - 1200 = 520$	$19 + 13 = 32 - 22 = 10$
12	Begada <i>ma</i>	Pramāna sruti above <i>sa</i> and not used	$520 + 702 = 1222 - 1200 = 22$	$10 + 13 = 23 - 22 = 1$

CYCLE OF FOURTHS

No, of the cycle	Basic note	Resulting note	Value in cents	Value in sruti number
1	<i>sa</i>	suddha <i>ma</i>	498	9
2	suddha <i>ma</i>	Bhairavi <i>ni</i>	$498 + 498 = 996$	$9 + 9 = 18$
3	Bhairavi <i>ni</i>	Bhairavi <i>ga</i>	$996 + 498 = 1494 - 1200 = 294$	$18 + 9 = 27 - 22 = 5$
4	Bhairavi <i>ga</i>	Ekasruti <i>dha</i>	$294 + 498 = 792$	$5 + 9 = 14$
5	Ekasruti <i>dha</i>	Ekasruti <i>ri</i> or Gaula <i>ri</i>	$792 + 498 = 1290 - 1200 = 90$	$14 + 9 = 23 - 22 = 1$
6	Gaula <i>ri</i>	Prati <i>ma</i>	$90 + 498 = 588$ or 590	$1 + 9 = 10$ or 11
7	Prati <i>ma</i>	Kākalī <i>ni</i>	$590 + 498 = 1088$	$11 + 9 = 20$
8	Kākalī <i>ni</i>	Antara <i>ga</i>	$1088 + 498 = 1586 - 1200 = 386$	$20 + 9 = 29 - 22 = 7$
9	Antara <i>ga</i>	Trisruti <i>dha</i>	$386 + 498 = 884$	$7 + 9 = 16$
10	Trisruti <i>dha</i>	Trisruti <i>ri</i>	$884 + 498 = 1382 - 1200 = 182$	$16 + 9 = 25 - 22 = 3$
11	Trisruti <i>ri</i>	Pramāna sruti below <i>pa</i> and not used	$182 + 498 = 680$	$3 + 9 = 12$
12	Pramāna sruti below <i>pa</i>	Pramāna sruti below <i>sa</i> and not used	$680 + 498 = 1178$	$12 + 9 = 21$

EXPERIMENTAL VINAS

The vina was not only used as a concert instrument from early times, but was also used for studying and verifying the various musical laws and phenomena. Both the harp type and the lute type of vinas have been in existence from the vedic times. The emergence of the fretted vina with its immense possibilities for playing *subtle gamakas*, naturally forced the harp type of vina into oblivion.

A study of the notes obtained in the cycles of fifths and fourths enabled the ancient scholars to perceive the different musical intervals. They were already familiar with the *chatussruti* interval ($9/8$ or 204 cents), *trisi* *sruti* interval ($10/9$ or 182 cents) and the *dvisruti* interval ($16/15$ or 112 cents) in the *sa grāma*. The *ma grāma* helped them to appreciate the interval of a *pramāna sruti*, 22 cents. When the notes of the cycles of fifths and fourths, worked up to the 12th cycle in each case, were reduced to one octave and studied, it was found that there were 13 twins of notes, inclusive of the octave *shadja*, the notes constituting each twin being separated by the interval of a *pramāna sruti* (comma $81/80$ or 22 cents). It was also noticed that in each twin, the lower note belonged to the cycle of fourths and the higher note to the cycle of fifths. The same study helped them to realise that in addition to the *pramāna sruti*, there were two other types of *ekasruti* intervals: $25/24$ or 70 cents and $256/243$ or 90 cents.

In his *Nāṭya Sāstra* (4th cent. B.C.) Bharata has suggested an interesting experiment to get a clear grasp of these three types of *ekasruti* intervals. These three types of *ekasruti* intervals are in the increasing order of magnitude

respectively termed the *pramāna*, *nyūna* and *pūrṇa sruti* intervals or the srutis of minimum, medium and maximum values

Two vinas which were exactly identical in all respects, including the timbre of their notes were chosen and tuned to the scale of *sa grāma*. That is, the seven strings of each vina were tuned to the notes of the following frequencies —

s	r	g	m	p	d	n
1	10/9	32/27	4/3	3/2	5/3	16/9

These two seven stringed vinas were of the harp type and were played on open strings. Fig 1 (p 34) shows visually the identical pitch to which the seven strings of the two vinas were tuned. Of the two vinas, the pitch of one was kept constant and this was called the *Dhruva vina* or the *Achala vina*. This stationary vina (A) was used for reference. The other vina called the *chala vina* (B) was subjected to progressive reductions in pitch in four successive stages. At each stage, the reduction effected was by an interval of one *sruti*. Although the phrase '*reduction by an interval of one sruti*' might lead to the inference that the reduction effected in each case was equal, still the phrase added by Bharata at the end of each stage, that such and such a note of the Chala vina will now be equal to such and such a note of the Dhruva vina, conclusively proves that the reduction in pitch, effected at each stage, though within the limits of an *ekasruti* interval is still not the same.

Now to the experiment described by Bharata —

Stage 1 'Let the *pa* string of the chala vina be reduced by one *sruti*. The scale of the chala vina will now be that of *ma grāma*'.

The frequency of this reduced panchama is only $40/27$ or 680 cents and not any other pitch, since between this note and the dharvata above there was a chatussruti interval. The Panchama string was thus reduced by an interval of a comma or a pramāna sruti.

Now convert the scale of this chala vina into one of *sa grāma*, by lowering the pitches of the remaining six strings by the same interval of a pramāna sruti.

The strings were reduced in pitch by slightly decreasing the tension *i.e.*, by loosening the strings to the required extent. Both the vinas became now *sa grāma* vinas, but the tonic note of the chala vina was a comma lower down, compared to the pitch of the achala vina. Fig 2 clearly shows how each string of the chala vina is a pramāna sruti lower than that of the corresponding string of the dhruva vina.

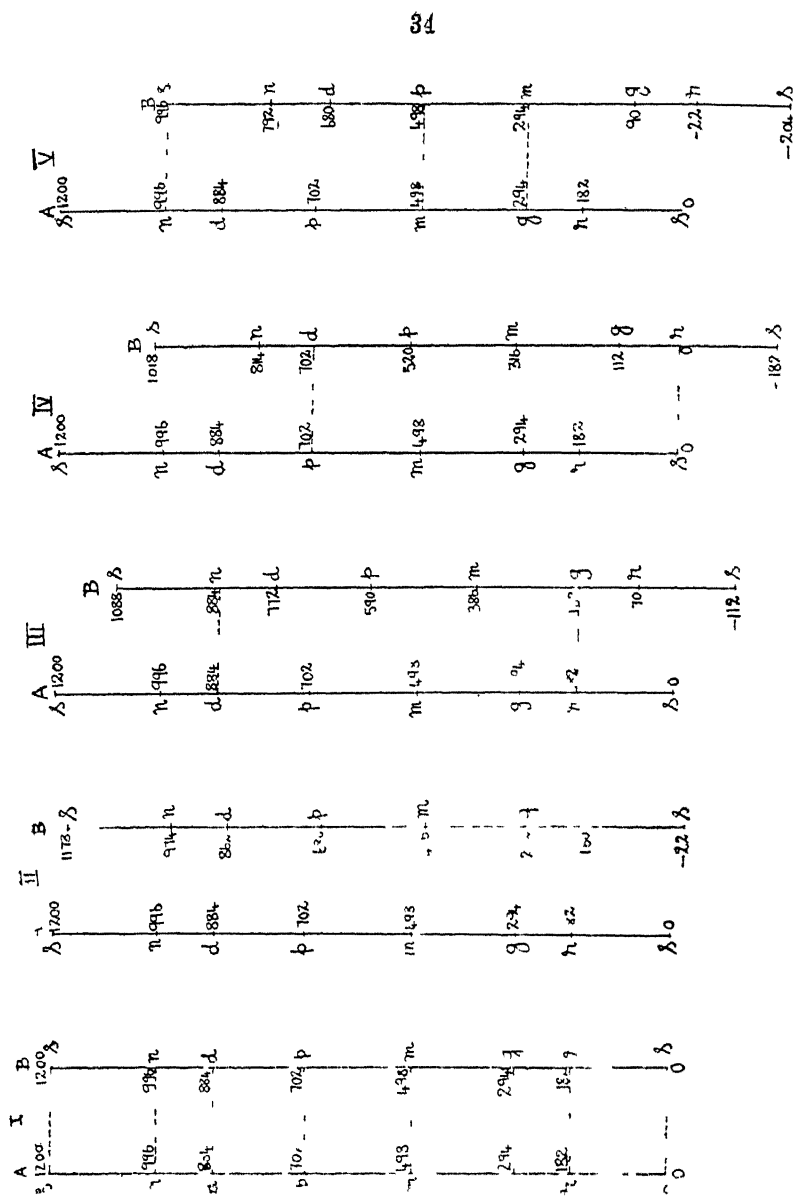
Stage 2 'Reduce the panchama of the chala vina again by one sruti and afterwards reduce the other six strings also by the same interval. The gāndhāra and nishāda of the chala vina will now be found to coincide in pitch with the uśhabha and dharvata of the achala vina' (Fig 3). This means that the extent of the reduction was such as to make this coincidence of notes possible. The sum total of the reduction made in the two stages is thus equal to an interval of a diatonic semitone, $16/15$ or 112 cents. Since the first reduction was by an interval of a comma, it is evident that the reduction in stage 2 was by an interval of a pūrṇa sruti $256/243$ or 90 cents. It is clearly seen that each string of the chala vina is a pūrṇa dvistruti interval below the corresponding string of the dhruva vina,

Stage 3 'Reduce the panchama of the chala vina again by one sruti and follow this up by reducing the pitch of the other six strings similarly. The dhaivata and rishabha of the chala vina will now be found to coincide with the panchama and shadja of the dhiuva vina' (Fig 4). This means that the extent of the reduction was such as to make this coincidence possible. The sum total of the reduction made in all the three stages was equal to an interval of a minor tone, $10/9$ or 182 cents. Since the total reduction made at the end of the second stage was a diatonic semitone it follows that the reduction made in the third stage was by an interval of a nyūna sruti, $25/24$, or 70 cents. It is thus seen that the pitch of each string of the chala vina is now less than that of the corresponding string of the dhiuva vina by the interval of a trisruti.

Stage 4 'Reduce the panchama of the chala vina again by one sruti and carry out this process for the other six strings as well. It will now be found that the *pa*, *ma* and *sa* of the chala vina coincide with the *ma*, *ga* and *ni* of the achala vina' (Fig 5). It is clear that the reduction effected in this last case is by a pramāna sruti, since the notes of the pairs *pa* and *ma*, *ma* and *ga*, and *sa* and *ni* have between them a chatussruti interval. We thus find that the pitch of each string of the chala vina is less than that of the dhiuva vina by a major tone, $9/8$ or 204 cents.

Thus the effective reduction in pitch made in,

Stage 1	was a	pramāna sruti	$81/80$
Stage 2	„	pūna sruti	$256/243$
Stage 3	„	nyūna sruti	$25/24$
Stage 4	„	pramāna sruti	$81/80$



In other words, the reduction has been respectively by the intervals of a minimum sruti, maximum sruti, medium sruti and minimum sruti. In terms of the shādja of the dhruva vina, the frequencies of the panchama string of the chala vina at the four respective stages were $40/27$, $45/32$, $27/20$ (the frequency of Begada madhyama), and $4/3$. It should be remembered that the scale of the chala vina at the conclusion of each change of pitch of the seven strings was one of *sa grama*, the value of the ādhāra shādja progressively decreasing in each case.

One interesting point in Bharata's experiment is, he asks us to start the reduction in each case with the panchama string. As a practical musician, he knew and fully realised the value of initiating the change from the string which gave the strong consonant note.

The object of Bharata in devising this experiment was:—

1 To demonstrate the three types of ekasruti intervals that occurred in the Indian musical scale.

2 To familiarize musicians with the idea of inversion of intervals. Thus the Begada madhyama is an inverted minor tone from the panchama.

3 To impress the distinction between absolute pitch and relative pitch.

4 To illustrate the 22 srutis.

It is useful to remember that in ancient times all musical instruments were tuned to absolute pitch as is the case with European musical instruments even now and the middle octave shādja was a note of a precise frequency just like the international philharmonic pitch.

With the emergence of the concept of ādhāra shādja in the post-Bharata period all ragas came to be sung to a common tonic note. Again the emergence of the concept of shādja and panchama as avikṛta svaias made the piamāna sruti intervals around these two notes fade into insignificance. The note of frequency 40/27 so prominent in the *ma grama* fell into desuetude along with the *ma grama* and gradually gave way to the note 64/45 which came to be called by various names as kaisikī panchama, midu panchama and varāli madhyama.

Bharata in his experiment missed the note 64/45 because he was proceeding downwards from panchama. If he had proceeded upwards from suddha ma, he would have hit upon the note 64/45. He adopted the downward course since he wanted in the first instance to illustrate practically the *ma grama* and hence the note 40/27 had to be touched. The other notes got in successive reductions were only 45/32, 27/20 and 4/3. This is clear from the rider which he has given at each stage i.e. that such and such note of the chala vina coincides with such and such a note of the dhruva vina.

This experiment can even now be performed with the instrument *Grāma Murchhanā Pradarsini* devised by the author and Bharata's conclusions verified. Those who perform this experiment will incidentally get training in the reduction of pitch by such delicate intervals as piamāna, nyūna and pūrṇa srutis.

CHAPTER III

SURVIVAL OF THE USEFUL AND THE BEAUTIFUL IN THE REALM OF MUSIC

Just as in biology we have the theory of the 'survival of the fittest', we may enunciate the following theories for music—the '*survival of the useful*' in the domain of theory and the '*survival of the beautiful*' in the domain of practical music. As one reads through the history of Indian music carefully and analyses the contents of the various works written during the last two thousand years, and examines the programmes given by musicians in the courts in the past, one realises the truth of these two statements. In the domain of musicology, only those theories and concepts which were logical and useful and appealed to the musical sense have survived. All the rest have become things of the past. Such obsolete concepts and theories are now of mere academic interest. Likewise in the sphere of lakshya or practical music, posterity has cared to remember only the beautiful compositions. We still remember and sing with reverence the Ashtapadis of Jayadeva because of their inherent beauty. There were a number of composers in the medieval period after Jayadeva, but their compositions have been forgotten totally or at best only some of them are remembered and sung. The numerous types of Prabandhas mentioned in the *Brhaddeśi*, *Sangita Ratnākara* and later works have all sunk into oblivion. The brilliant padas and kritīs of the composers of the modern period came like an avalanche and swept overboard all those compositions whose claims to musical permanence were of a doubtful character. The compositions of Tyāgarāja and other classical composers are destined to live till eternity because of the inherent beauty in them.

The emergence of the janaka-janya system of rāga classification, a system which is both logical and scientific, made all other earlier systems of rāga classification pale into insignificance. There is nothing in the earlier systems of classification which is not covered, absorbed or implied in the all embracing janaka-janya system. The enunciation of the scheme of 72 melas served to clarify, regularise and crystallise some of the earlier nebulous ideas. The grāma-mūrchhanā-jāti system, the suddha - chhāyā-laga-samkīna system, the rāga-rāgini-paivāna system, the classification into puruṣa, sthā and napumsaka ragas, duti rāgas, dāsa ragas and dāsī ragas and Pārsvadeva's classification into rāgāṅga sampūrṇa, rāgāṅga shūḍava, rāgāṅga audava etc., the classification into pan (பன்) and tiram (திரம்) and all other earlier systems of rāga classification are now of only academic interest. Rāgas have been there although they attained their full stature and form later in the hands of geniuses like Tyāgarāja. The janaka-janya system also paved the way for the creation of new rāgas.

It is also true that a more logical and comprehensive concept supersedes an earlier illogical or imperfect concept. The later concept, that a mela should have a krama sampūrṇa ārohana and āvarohana, if it is to maintain its significance as a generator of rāgas, was found logical and came to be readily accepted. Thus the earlier asampūrṇa melas gave way to the later sampūrṇa melas. The absurdity of elevating a janya rāga to the status of a mela and making it the parent (janaka) scale for another janya rāga of an equal status was realised and the scheme of 72 sampūrṇa sampūrṇa scales was readily accepted. This scheme of 72 scales is not only of logical interest but also of interest from the point of view of

world music, since the 12 notes of the gamut are known and universally used in all the civilised systems of music

When the word 'raga' with its fuller melodic connotation and significance came into use in the post-Bhāṭata period, the earlier word 'jāti' naturally lost all importance

The absurdity of calling the rishabha and dhaivata of the Sankarābhaṭana rāga as panchasruti *ri* and panchasruti *dha* by some scholars of the 16th and 17th centuries became patent. With the emergence of the correct and self-explanatory names, chatussruti *ri* and chatussruti *dha*, the above terms were given a go-by. It is a matter for pity that some scholars, innocent of practical music, should go to the length of literally interpreting the terms panchasruti *ri* and panchasruti *dha* and conclude that Sankarābhaṭana (one of the old and most wellknown rāgas) took the notes of frequencies, 32/27 and 16/9 (actually Bhāṇavi *ga* and *ni*), in the place of the notes 9/8 and 27/16

Useless concepts like the classification of rāgas into *uttama*, *madhyama* and *adhama*, enunciated by Rāmāmātya and endorsed by Somanātha have naturally fallen into desuetude

The utility of the katapayādi formula, the bhūta *sankhya*, the reference to the tāla angas, *drutam*, *laghu*, *guru* and *plutam* by their initial consonants, *da*, *la*, *ga* and *pa*, the representation of the varieties of a note by resorting to the vowel change in its solfa name, have been recognised. Such mnemonics are good aids to memory. How cleverly these devices have been employed, will be clear to any one who peruses the nomenclatures for the 72 melas, 12 chakras,

24 sūtris (as given in the *Sangita Sāra Sangrahamu*), 35 tālas (*pika-vatī* nomenclature) and the slokas for the 108 tālas

The present meaning associated with the term bhāshāṅga rāga is of recent origin. Rāgas which took foreign notes had distinctive individualities of their own and musical recognition had to be given to them. The term bhāshāṅga rāga came in hand for the purpose and was used to signify such rāgas. The earlier meaning of the term bhāshāṅga rāga was somewhat different.

A concept which was once useful, might in the light of the subsequent development of the art become archaic or useless. The concepts of graha svara and kriyāṅga rāga are instances in point. In ancient music i.e., in the harp age, the term graha svara meant the note on which the mūrchhanā or the jāti commenced. It should be remembered that in ancient music, the idea of the fundamental or the ādhāra shadja was unknown. The harp was tuned to absolute pitch and to a fundamental scale, in three octaves. The other scales were performed by the shift of the tonic note to the appropriate string. With the emergence of the concept of ādhāra shadja, all the rāgas and melodies in them came to be performed to one tonic note. Vainly did the authors of the lakshana gitas of the post medieval period cling to this term. They said that shadja was the graha svara for many rāgas. In a few cases the mention of the name of the graha svara gave the clue to the most apt note on which melodies can commence in that rāga. Thus the mention of *ni* by some and *dha* by others as the graha svara for Bhairavi coincides with the fact that many compositions in Bhairavi commence on *ni* and some on *dha*. But we cannot ignore

the fact that a good number of important pieces in Bhairavi also begin on *ri* (*Raksha bettare* of Tyagaraja, *Ni pādamule* of Patnam Subrahmanya Iyer and *Ika nannu brova* of Pallavi Seshayyar) All the other items mentioned under the *trayo dasa lakshanas* for *jātis* have been incorporated in the later details relating to the study of the *lakshana* of *rāgas*

The term *kriyāṅga rāga* has now lost all significance. The confused meanings given for this term by scholars during the medieval period only prove their anxiety to give some intelligible meaning to it. Any way, the fact remains, that the present study of the *lakshana* of a *rāga* is very comprehensive and includes within it every aspect of the *rāga*, expressly or impliedly given expression to, by earlier musicologists

In South Indian music at present, the term *suddha svara*, refers to the lowest-pitched variety of a note. Thus of the varieties of *ri*, *ga*, *ma*, *dha* and *ni* (*sa* and *pa* being fixed notes and not admitting of varieties), the lowest pitched variety in each case is termed the *suddha svara*. Thus *Kanakāṅgi* which takes all *suddha svaras*, is the *suddha scale* of South Indian music. This concept of a *suddha svara* which is entirely different from the ancient concept was found logical and accepted by scholars of the post medieval period

Gāndhāra grāma

Although the *Grāma-Mūrchhanā Jāti* system is now obsolete and is absorbed in the same or slightly modified form in the later comprehensive *janaka-janya* system, still let us not forget the fact that it is this antiquated system that proves beyond doubt that India had an accurate tone system

in the distant past It also proves that the early musicologists of India knew

- (1) the method of deriving scales by the process of modal shift of tonic ,
- (2) the cycle of fifths (which includes within it the cycle of fourths as well—the fourth being an under fifth) ,
- (3) the consonant and dissonant intervals ,
- (4) the values of the different musical intervals , and
- (5) the heptatonic and transilient scales

The experiments described with the Dhruva vīnā and the Chala vīnā prove conclusively that the ancients had a precise knowledge of such subtle intervals as $256/243$ (pūna sruti), $25/24$ (nyūna sruti) and $81/80$ (pramāna sruti), not to speak of the larger intervals like $16/15$, $10/9$ and $9/8$

Grāmas were heptatonic scales with notes of definite frequencies They were the earliest known scales and were analogous to the present day melas The interpretation that a grāma meant a collection of all the notes used in a scale is a later one and was given when, with the emergence of the concept of rāga and rāga classification, the term ceased to be of any significance

Of the shadja, madhyama and gāndhāra grāmas mentioned in early literature, the gāndhāra grāma seems to be the earliest It is referred to in the *Mahābhārata* and in some *Purānas* It became obsolete by the time of Bharata and Dattila Bharata refers only to the sa grāma and ma grāma *Naradī śikshā*

refers to the gāndhāra grāma and this fact makes us conclude that this small work must have been written before the *Nāṭya Sāstra*

It is a pity that faulty interpretation of the ancient texts had led some scholars to opine that *sa grāma* signified singing with shadja as sruti or the tonic note, *ma grāma* with madhyama as the tonic note (i.e. singing in madhyama sruti), and *ga grāma* with gāndhāra as the tonic note. Equally wrong is the interpretation that *sa grāma* signified mūrchhanās in the mandira sthāyi (lower octave), *ma grāma* signified mūrchhanās in the madhya sthāyi (middle octave), and *ga grāma* signified mūrchhanās in the tāra sthāyi (higher octave). Although there is a unanimity of opinion with regard to the values of the notes of the *sa* and *ma grāmas*, there has been a confusion with regard to the values of the notes of the *ga grāma*. The three grāmas had their respective deities: Brahma, Vishnu and Mahesvara. The basic mūrchhanā in each case was the one that started from the *svara nāma* of the grāma. Thus in *sa grāma* it was *uttaramandra* which started from *sa*, in *ma grāma* it was *sauviri* which started from *ma* and in *ga grāma* it was *nanda* which started from *ga*. Amongst the later works which mention the three grāmas, may be mentioned the *Chaturdandi prakāśika* and the *Svarārṇava*, the work to which Tyāgarāja had access.

It may incidentally be mentioned that the word *grāma* seems to be the original of the word *gamut* in the English language. Gamut is gamma ut (ut is doh or shadja) = gamma sa or sa grāma.

All the three grāmas were heptatonic scales and took the notes which occurred in the cycle of fifths.

The frequencies of the notes that figured in the three grāmas were as follows

	<i>s</i>	<i>r</i>	<i>g</i>	<i>m</i>	<i>p</i>	<i>d</i>	<i>n</i>
Sa grāma	1	10/9 (182)	32/27 (294)	4/3 (498)	3/2 (702)	5/3 (884)	16/9 (996)
Ma grāma	1	10/9 (182)	32/27 (294)	4/3 (498)	40/27 (680)	5/3 (884)	16/9 (996)
Ga grāma	1	16/15 (112)	6/5 (316)	4/3 (498)	40/27 (680)	8/5 (814)	9/5 (1018)

(The fractions give the ratios of the frequencies of the notes to *sa* as equal to 1, and the figures in brackets give the values of the notes in cyclic cents)

In *sa grāma*, the panchama stood on its final or ultimate sruti and in *ma grāma* on its penultimate sruti. The values given here for the *ga grāma* are from the *Sangita Ratnākara*. Śārṅgadeva himself quotes Nārada Muni for the values given by him. Since in the *Ratnākara*, the *ga grāma* is referred to after the *sa* and *ma grāmas*, it is evident that with the suddha svaras of *sa grāma* as the basic scale, the *ga grāma* notes were evaluated. The relevant portions read as follows —

“Gāndhāra takes one sruti from *ri*, which means that *ri* gets reduced from its trisruti value to the dvīsruti value; *re* from 10/9 to 16/15, *ga* also takes one sruti from *ma*, which means that the *ga* is raised by a sruti, *re* its value is raised to 6/5 from 32/27. In consequence, the original interval of 9/8 that existed between *ga* and *ma* now becomes a trisruti interval of 10/9. The *dha* takes one sruti from *pa*, which means that the *pa* 3/2 gets reduced to the frequency 40/27 the *ni* takes one sruti from *dha* which means that the *dha* 5/3 gets reduced to

8/5, the *ni* also takes one *sruti* from *tāra śhādja*, which means that the frequency of *ni* gets increased from 16/9 to 9/5”

(Note When from a lower note, a higher note gains or takes a *sruti*, it means the lower note gets flattened or reduced by that *sruti* interval. When from a higher note, a lower note gains or takes a *sruti*, it means that the lower note itself is sharpened or increased in pitch by that *sruti* interval).

Here also the term *sruti* is not a fixed mathematical quantity. Where a note is said to take one *sruti* from a lower note or from a higher note, the reduction or increase in pitch must be by one of the recognised values of *ekasruti* intervals. The reduction or increase should be by such a value that the resulting note should be a musical note belonging to the cycle of fifths or fourths. The arguments that held good concerning the experiments relating to the *dhruva vīṇā* and *chala vīṇā* held good here also. Thus when *ga* took one *sruti* from *ri* the reduction suffered by *ri* was by the interval 25/24 ($16/15 \times 25/24 = 10/9$), similarly when *ga* took one *sruti* from *ma* the increase in pitch gained by *ga* was by an interval of a *pramāṇa sruti* 81/80 ($32/27 \times 81/80 = 6/5$).

In the *ga grāma*, the pairs of notes *sa* and *ma*, *ri* and *dha* and *ga* and *ni* were *samvādīs*. The interval between *ga* and *ma*, between *ma* and *pa* between *ni* and *sa* was the same, i.e. 10/9 or a *trīśruti* interval.

To us who are accustomed to regard *sa* and *pa* as *avalkṛta svaras*, the very idea of singing the diminished *panchama* with the letter *pa* may seem ludicrous, but in ancient instrumental music, the idea of performing to one

ādhāra shadja was not known. In the haip age, the ga grāma as also the ma grāma were quite workable. That was the age of jātis, when the idea of a rāga with all its melodic implications and possibilities had not yet dawned. The ga grāma bereft of the reduced panchama would be the scale of Suddha Todī (*s r g m d n s*) and could have been played admirably on the haip. Excepting for the fact that the note 40/27 could not from its very nature be used along with the perfect fifth, $3/2$, it was a sound note which could follow the suddha madhyama or precede the dhaivata, when the change of the fundamental from sa is visualised. After all, the grāma like a mela, was only a scale and intended to provide bases for possible rāgas.

The gāndhāra grāma was in course of time ignored because its rishabha, gāndhāra, dhaivata, and nishāda were re-discovered in the murchhanā uttarāyata of sa grāma, and its reduced panchama 40/27 in the madhyama grāma.

The svaras of the ga grāma can even now be heard in the Vedic chants (not the Sāma gāna) of the Vaidikas of South India.

In all the three grāmas, the initial notes of the murchhanās were in the downward order. The first murchhanā (Uttaramandī) of sa grāma began from sa, the first murchhanā (Saurī) of ma grāma began from ma and the first murchhanā (Nandā) of ga grāma began from ga. It is possible that the three grāmas were called Sa grāma, Ma grāma and Ga grāma respectively, because in each case the immediate higher and lower notes of each of those three notes sa, ma and ga were the correct udātta and anudātta svaras in the three grāmas—the *ri* and *ni* of sa grāma; the

reduced *pa* and *ga* of *ma grāma* and the *ma* and *ri* of *ga grāma*. The fact that later scholars give the values of the notes of the *ga grāma* in terms of the notes of the *sa grāma*, need not create the impression that the *ga grāma* is later than the above two *grāmas*. It is but natural that they should have attempted an evaluation of the notes of the *ga grāma* in terms of the notes of the *sa grāma*, which was then in existence.

That the frequency of the fifth note of the *ma grāma* was only $40/27$ and not $64/45$ is beyond question, since it is clearly mentioned that there was a *chatussruti* interval between this note and the *dhaivata* above. If it is conceded that the reduced *panchama* is $64/45$, then we have to subscribe to the absurd proposition that the *chatussruti* interval had two values in one and the same scale. The acceptance of the interval $64/45$ would also mean that an interval greater than a major tone ($9/8$) was used, which was not the case in the early heptatonic scales. Such intervals occurred only in transient scales. Further Bharata mentions (sl 21—Chap 28 of the *Nāṭya Sāstra*) that this reduced *panchama* in the *ma grāma* bore a *samvādi* relationship to the *rishabha* ($10/9$) which proves that its frequency must have been $40/27$ i.e., $10/9 \times 4/3$. The note $40/27$ occurs as the eleventh note in the cycle of fourths or under fifths. In the experiment relating to the *Dhruva vinā* and *Chala vinā*, it is clear that in the first stage, the flattening of the *panchama* (perfect fifth) of the *sa grāma vinā* by a *sruti*, to convert it into *ma grāma vinā* or sharpening of the fifth note of the *ma grāma vinā* by a *sruti*, to convert it into *sa grāma vinā*, was by a *pramāṇa sruti* interval $81/80$. The *ridai* was given, that

between the reduced panchama and the dhaivata above, there was a chatussruti interval. If the panchama was reduced to $64/45$ the reduction would not be by one sruti but by about a semi-tone, $135/128$ or a nyūna dvīsruti interval. The reduced panchama is significantly enough referred to as the Kaisiki Panchama, Trīsruti Panchama and Mrīdu Panchama which terms are all self-explanatory and only confirm the fact that this note was only slightly less than the perfect fifth and did not differ from it by such a large interval as $135/128$. In the ma grāma, the reduced panchama alone was vikṛta which means that all the other notes were of the same frequency as those of the sa grāma.

Medieval and post-medieval scholars in their anxiety to find a place for the kaisiki panchama in the later tone system, identified the reduced pa of ma grāma, with the Varāṇsi madhyama $64/45$. But there is no doubt that the frequency of the svopāntya (penultimate) sruti of the panchama of ma grāma was none other than the note of frequency $40/27$. The notes *ri*, *ga*, *dha* and *ni* of the ga grāma, were rediscovered in the rishabha murchhanā of sa grāma. Shādja and suādha ma of ga grāma also occurred in sa grāma. The only note left out was the reduced panchama. In order not to lose sight of it and also to give a fresh lease of life to it, it was incorporated in the ma grāma. Whereas the *ni* murchhanā of sa grāma gave our Sankarābharana, the *ni* murchhanā of ma grāma gave the exact major diatonic scale of European music, with its trīsruti dha $5/3$. If you imagine a sa grāma vina and a ma grāma vina wherein the frets are so placed that the notes emanating from them give respectively the notes of the two grāmas, the first fret giving the note sa, the second *ri*, the third *ga* and so on, it will be

found that when the open string of the vīṇā in each case is taken as the tonic note or ādhāra shadja and played, the sa grāma vīṇā will be found to give the Sankarābharana scale and the ma grāma vīṇā the major diatonic scale of the west. It is possible that the major diatonic scale evolved in this manner.

The merit of the sa grāma lay in the fact that it took a pair of symmetrical tetrachords, separated by the interval of a major tone, a feature not noticeable in the other two grāmas. In other words, the graphs of the two tetrachords in the sa grāma would be exactly alike. In the madhyama grāma and gāndhāra grāma the tetrachords were separated by the interval of a minor tone or trisruti interval 10/9.

Tyāgarāja clarified the two ragas Bhairavi and Kharaharapriya, by incorporating in the former, the gāndhāra and nishāda of sa grāma and in the latter, the gāndhāra and nishāda of ga grāma. The statement made by many scholars in the past that the ga grāma has gone to Indraloka need not be taken literally.

CHAPTER IV

ORIGIN OF SCALES AND RAGAS

One of the topics that is of interest to the student of comparative musicology is the study of the scales used by the different nations of the world. In ancient music we find only a few scales being used. Most of the civilised nations knew the method of deriving scales by the process of *modal shift of tonic*. In this process, it may be noted, there is a fundamental scale or *suddha mela* to start with. By taking respectively each note of the scale as the tonic note or the *ādihāra shādja* and playing the self-same notes of the original scale, new scales result. New scales result, because of the re-distribution of intervals, consequent on the shifting of the basic shādja. This process is popularly known as *graha bhēdām*, *graha svara bhēdam* and *sṛuṭi bhēdam*. It was by the application of this principle that mūrchanās like *Rajani* and *Uttarāyata* were derived from shādja grāma; and scales like *Padumalaip-pālai* and *sevalip-pālai* were derived in ancient Tamil music. The *Irak mode*, *Mezmoum mode*, *Edzeil mode*, *Djorka mode* etc., of Arab music and the ancient Greek and Ecclesiastical scales were all derived by the same process. Whereas other nations stopped with a limited application of this principle, it was given to the Indian genius to carry the application of this principle to its logical conclusions, in the sphere of both heptatonic and transilient scales. As a consequence we find Indian music today with an amazingly rich variety of scales. This plethora of scales is astounding and demands an independent study by itself by music scholars all over the world. The scales evolved are so all-embracing in their character that it is impossible for any genius to think of a new scale which will not come within the ambit of the system. It may be of

interest to note in this connection that the whole-tone scale, brought to prominence by Debussy in Europe is the same as the janya raga *Gopriya* (s r g m d n s - s n d m g r s) derived from the 62nd melakarta, Rishabhapriya, and the scale of *Prometheus* of the Russian composer Scriabine is the 64th melakarta rāga *Vāchaspati*, and the Pythagorean scale is seen in the avarohana of *Devagāndhārī*

Gopriya furnishes the solitary example of a rāga which results in the same scale in the process of graha bheda, whatever be the tonic note chosen

In the scales that result by the application of the process of modal shift of tonic, a few notes may have to be slightly increased or decreased in pitch by a pramāṇa śruti in order to get at the correct musical intervals. The pitch of the concerned strings in such cases was readjusted and the resultant scale played from the new tonic note. This problem concerns only the performers on the harp or the yāzh. In the fretted vinā, the correct pitch of the note was produced by deflection of the string from the concerned svarasthāna or from a lower fret.

The scale of *sāmagāna* is the earliest scale of India. The modern Kharaharapriya rāga approximately corresponds to it. It is in the fitness of things that the 22nd melakarta is named *Harapriya*, (*Āhara* being there only to give the number 22 by the application of the katapayādi formula), for *Śiva* delights in *sāma gāna*. The process of modal shift of tonic applied to the *sāma gāna* scale yielded the scales known to modern music as, Hanumatodi, Mechakalyāni, Harikāmbhoji, Natabhairavi, Todī with the vikṛta panchama and Dhira Sankarābharana. It should be noted that in ancient

times, the harp which was played on open strings was tuned to the fundamental scale. Whenever it was desired to play another scale, that particular string was taken as the tonic note, which gave the desired scale. All the scales mentioned above were heptatonic scales and a study of them gave the knowledge of the (now universal) twelve notes of the octave.

Although the music scholars of India and other countries knew of these twelve notes of the octave for some centuries, yet the idea of working out the possible number of heptatonic scales based on these twelve notes did not strike any body until the 17th century. For one thing when European music began to develop along the lines of polyphony and harmony, it had no need for a multiplicity of scales.

Musical instruments have played a great part in the development of music of both the orient and the occident. The coming into existence of the modern *vinā* with the 24 fixed frets (12 for each octave) constitutes an important landmark in the history of Indian music. It was this instrument that paved the way for the development of the now famous scheme of seventy-two *melakartas*. We owe the perfection of the *vinā* to the ruler Raghunātha Nāik (early 17th century) of Tanjore and it is for this reason that the modern *vinā* is referred to as Tanjore *vinā* and some times also as Raghunātha *vinā*. Prior to his time, the frets on the *vinā* were movable and their number also varied. Still earlier, the *vinā* had a plain finger-board with two strings and this is the instrument which we see often in the early sculptures.

The scheme of 72 melakartas which we owe to Venkata-makhi is one of the proud heritages of humanity. This scheme is not of mere academic or local interest. It is of interest to musicians and music scholars all over the world, based as it is on the universally known 12 semitones of the gamut. This scheme is one of the gifts of India to world's musicology.

It is sometimes said that Venkatamakhi might as well have stopped with the 32 logical and non-vivādi melas and not troubled himself with the more perfect and ambitious scheme of 72 melakartas including within it the vivādi melas as well. Here again it was the "process of modal shift of tonic that enabled him to get a glimpse at some of the vivādi melas".¹ He could not resist the temptation of evolving a scheme in which there will be a place even for these vivādi melas. This led him to the formulation of a complete scheme of 72 melakartas or hepta-tonic scales with perfect fifths.

The number of sampūrṇa melas known before Venkata makhi's time was very small. The six melas referred to above and Pantuvarāli, Māyāmālavagaula and Varāli definitely existed before his time. Pantuvarāli is known as Rāmakriya in Sanskrit works. This and the fact that the South Indian Bhūpāla rāga (with the antara gāndhāra and not with the sādghārana gāndhāra) is referred to in Sanskrit works as *Revagupti*, gives support to the theory that there was a parallel nomenclature in the vernaculars for many of the ragas mentioned in Sanskrit works. That Pantuvarāli and Rāmakriya are identical ragas is borne out by the fact

¹ Vivādi melas are those which take one or other of the following notes: Shatsruti rishabha, Suddha gandhara, Shatsruti dhaivata and Suddha aishada.

that Rāmamātya in his *Svaramēlakalānidhi* (1550) mentions Dīpaka raga as a janya of Rāmakriya Tyāgarāja has immortalised this Dīpaka raga in his kriti, *Kalala nerchina*

The idea of Pantuvarālī raga perhaps arose like this The musicians thought of a scale which, in addition to Shadja and Panchama (the two highly concordant notes), took notes which were a semitone above and below these two notes These with the fifth harmonic antara gāndhāra gave the Pantuvarālī Pantuvarālī's suddha madhyama mela gave Māyāmālavagaula This Pantuvarālī is the *Pan Sādārī*—a favourite raga of Siva It may be noted here that when Siva came in the guise of a wood cutter to save the reputation of the musician Bānabhadra, He sang Sādārī It may also be of interest to note that when Tyāgarāja visited Kovur the first song that he sang in praise of the Deity, Sundaresa was Sambho Mahādeva in Pantuvarālī or Sādārī

Venkatamakhi claims to have invented the raga Simhāravam This is only the prati madhyama parallel of Kharaharapriya The study of Sankarābhāiana and Kalyāni, two of the ancient six melas, suggested to him to work out the F-natural or F-sharp varieties as the case may be of the resulting melas got in the modal shift of tonic process at each stage The melas Hemavati, Bhavapriya Vachaspati, Shanmukhapriya and Ganamurti, (F-natural mela of Varālī) were thus arrived at Hemavati (58th mela) by the process of modal shift of tonic yielded Vakulābhāianam with *ri*, Kosalam with *ga*, and Kīravāni with *pa* These three melas in their turn suggested the Nāmanārāyani (50), Sūlini (35) and Simahendra madhyama (57)

Bhavapriya (44th mela) with *ga* yielded Vāgadhīśvari (34), and with *dha* yielded Nāgānandini (30) These melas in their turn suggested Nāsikabhūshani (70) and Chitrāmbari (66)

The 64th mela Vāchaspatī with *ri* yielded Chārukesī (26), with *pa* gave Ġaurimanoḥari (23), and with *dha* gave Nātakapriya (10) These melas in their turn suggested the 62nd Rīṣhabapriya, the 59th Dhārmavati and the 46th Shadvidhamārgini

The 56th mela Shanmukhapriya with *pa* gave Dhenuka The Pratimadhyama mela of this is the Subhapantuvarālī (45)

The process of modal shift of tonic applied to these resultant melas yielded many more melas Pantuvarālī's nishāda as shadja gave Kanakāngī, the first mela, while Māyāmālavagaula's rīṣhabha as shadja gave Rasikapriya, the last and the seventy second mela The study of the lower and upper tetrachords of these two extreme melas must have suggested to Venkatamakhī the particular arrangement and grouping of melas under 12 chakras He was alive to the apparent vivādi character of 40 of the 72 melas, but since they were the resultant mūrchanās and were obtained as by-products from the non-vivādi melas and since they also came within the scope of the 12 notes of the octave, he had to include them Without their inclusion, his scheme would have lacked completeness He himself has suggested methods for getting over the vivāditva in the 40 melas The graced utterance of the concerned notes immediately removed the vivāditva. Again, in these melas, which had in them both the varieties of the same note, the difficulty was cleared by adopting the ingenious device of calling one of these notes by

the name of the next higher or lower note. It should be remembered that the melas resulting by the process of modal shift of tonic had to be touched here and there, i e, flattened or sharpened by a comma interval or *pramāna* *sruti* in some cases in order to get at the correct *ranjakatva*.

Even if Venkatamakhi had not enunciated the scheme of 72 melas, another musical thinker, who thought along these lines, would have formulated the scheme. It opened the gateways of a new heaven of possible (*janya*) ragas which were later worked out by genuises like Tyāgarāja. Scholars like Somanātha and the unknown author of the work still in manuscript form, *Melādhikāra lakshana*, (Tanjore Sarasvati Mahāl Library), devised various ingenious mela schemes based on *srutis* but they must all remain as mere mathematical possibilities and outside the realm of practical music. It is a well-known fact that in many ragas both the *srutis* included in a *svarasthāna* figure in the ascent and the descent. This being so, it is meaningless to devise a system of melas based on *srutis* alone. Systems of melas based on the 12 *svarasthānas* will however be workable and practicable. It should not be forgotten that the object of any system of melas is to provide a scheme of generic or parent scales for *janya* *rāgas*.

THE ORIGIN OF SOME RAGAS

In the realm of music, the urge for finding new scales and *rāgas* is primordial. Various experiments have been carried out by scholars from early times to find new scales. The scale of *Sāmagāna* paved the way for the development of the scale of *sa grāma*. The cycles of fifths and fourths were worked out to the limits of their musical possibilities and notes of musical worth discovered. The early occurrence

of the scale of *Mohana in the history of world music is to be attributed to the fact that the notes constituting that scale were those arrived at in the first four stages of the cycle of fifths

A rāga is a musical organism. It has its birth and growth, and in a few cases, its death as well. Rāgas like Sankarābharana, Kāmbhoji and Bhairavi are destined to live for all times. Some rāgas live for a few centuries or for a few decades and then die. Rāgas like Manjisa bhairavi, Kondamalahari and Mukhāri pantu were in vogue some centuries back but are now clean forgotten. Once a rāga is created, it gradually attains its full stature by being nourished by musical geniuses. The full melodic form of a rāga is not realised until after a long period of ratiocination and analytical study. The *rakti-hina* prayogas are weeded out and the *rakti-yuta* prayogas are retained. These are then codified and presented in *katakas* or rāga lexicons. These *katakas* give *in extenso* all the well-sounding and admissible phrases in a raga. The process of weighing the melodic worth of phrases in a raga is referred to as the *sphutam* of the rāga. Many scholars and composers have had their share in completing and perfecting the melodic picture of the known ragas. If we are now in a position to make ālāpanas of major ragas for some hours at a stretch, it is because of the fact that

*It is possible that in the *harp-age*, the frequencies of *ga* and *dha* of this scale were 81/64 and 27/16 respectively—the note 27/16 being the correct fifth of the *chatussruti* rishabha 9/8, which itself is the *pañchama* of *pañchama*, and the note 81/64, (Pythagorean major third) being the correct fifth of the *chatussruti* dhaivata. But in later times when all music came to be performed to one tonic note the stable note *antara gandhara* (the fifth harmonic, asserted itself and came to stay in Mohana. Its *samvadi* *svara* 5/3 likewise came to stay. It is therefore logical and natural to classify Mohana under *Harikambhoji* rather than under the *Sankarābharana* or the *Kalyani melas*.

such a thing has been made possible for us by the efforts of geniuses in the past. To our aural sense, even insignificant ragas like Karnāṭaka byāṅ, Dilīpakam and Māñjī are distinct entities, and compositions in them appear as carefully designed, delicately carved and attractively decorated statues.

Manuscripts containing elaborately developed tānas for ghana ragas and rakti ragas exist and these are referred to as authorities, whenever questions relating to the validity of a particular prayoga in a rāga is in dispute.

It may be mentioned in passing that the idea of a raga perhaps first originated with the instrumentalist who provided an accompaniment to the reciter of the vedic hymns. During the latter's moments of rest, the accompanist voluntarily played some phrases relevant to the music of his principal. These phrases which did not figure in the musical setting of the vedic hymns, helped him to realise that his supplementary music, considered along with the dhātu of his principal's music, emphasised the fact that, apart from the simple phrases used in the vedic chants, the scale itself admitted of a wider treatment. The idea of the melodic individuality of a jātī (rāga in ancient music) gradually came into existence and the ten factors or lakshanas that contributed to the melodic individuality of a jātī were gradually perceived. The jātis of ancient music included transilient scales as well, since Bharata in his ten lakshanas for jātis mentions the two factors, shādava and audava.

In the history of South Indian music, a few of the interesting ragas arrived at by the application of the process of modal shift of tonic to known ragas were.—

(1) *Sālagabhanavī* with the *nr* of *Dhanyāśī* as the tonic note

(2) *Nāgasvarīāvalī* with the *pa* of *Hamsadhvani* as the tonic note

(3) *Valajī*, with the *ma* of *Ābhogī* as the tonic note

(4) *Budhamanoharī* with the *mā* of *Kuntalā varālī* as the tonic note

(5) *Pushpalatikā*, with the *ni* of *Suddha todī* as the tonic note

(6) *Ābheṇī* with the *ri* of *Āīabhi* as the tonic note

The second method adopted for finding new scales and *rāgas* was by the re distribution or re-allocation of the *srutis* (i.e. by flattening or sharpening the pitch) of one or two notes of known scales or *rāgas*. The clue for this method was got from an analytical study of the six *murchhanās* of *sa gīāma*.

With the emergence of the concept of *ārohana* and *avarohana* as a factor in *rāga lakshana* and with the enunciation of the scheme of 72 *melas* in the 17th century, fresh possibilities arose. A known *ārohana-avarohana* pattern was taken up and its possibilities under different *melas* studied. The inspiration for this idea was got from pairs of *ragas* with a common *ārohana-avarohana* pattern, like *Mohana* and *Revaguptī*, and *Sāveri* and *Yadukulakāmbhojī*. Useless *ragas* were discarded and the melodically lustrous ones retained and named. Their *sanchāras* were carefully worked out. Thus the *Dhanyāśī* pattern (*s g m p n s—s n d p m g 1 s*) revealed *Mallikāvasantam*, under *Māyāmālavagaula*. *Pallavi Seshayyar* has composed a beautiful *krīti* in *Mallikāvasantam*. The *Kedāragaula* pattern

(s r m p n s—s n d p m g r s) suggested Gauri under Māyāmālavagaula and Kāndajvalana under Kāmavardhani. The Lalita pattern (s i g m d n s—s n d m g r s) suggested the Srīrajanī under Kharahapriya and Hamsānandī under Gamanāsrāma. The Suddha desī pattern (s r m p d n s—s n d p m g r s) suggested the Kāpinārāyanī under Hanikāmbhojī. The Suddha sīmantinī pattern (s r g m p d s—s d p m g r s) suggested the Chandīajyotī under the 41st mela and Vijayanāgarī under the 58th mela. Tīruvottiyū Tyāgayyar has composed a beautiful kriti in Vijayanāgarī raga, (see his *Sankīrtana Ratnavali*, P 126). Bilaharī suggested Mechabaulī under mela 15, Baulī suggested Srīmanī under the Ratnāngī mela, Kalagada suggested the Malayamārutam under Chakravāka and Kandaipamēnoharī under Mānavatī.

The fourth method adopted for finding new ragas was by thinking out the prati madhyama parallels to known suddha madhyama ragas and *vice versa*. Thus Kāmbhojī (s r g m p d s—s n d p m g r s) paved the way for Bhūshāvalī under Vāchaspatī, and Mandārī (s r g m p n s—s n p m g r s) paved the way for Kṛishnavenī under Māyāmālavagaula.

The fifth method adopted for finding new ragas was to take a raga and exchange its ārohana for the avārohana and its avarohana for the ārohana. This is possible only in non-symmetrical ragas. Thus Bilaharī (s r g p d s—s n d p m g r s) paved the way for Garudadhvanī (s r g m p d n s—s d p g r s), both being janyas of the same mela. The ārohana and avarohana of Garudadhvanī may be described as the *viloma-krama* version of the ārohana and avarohana of Bilaharī. Gaurī and Ardhāambarī are another pair of similar ragas.

The sixth method adopted for finding new ragas was to take the ārohana of a known raga and the avarohana of another known raga and combine them Mohana kalyāṇi (s r g p d s — s n d p m g r s), a janya of the 65th mela, resulted in this way

Seventhly, the aesthetic beauty of certain vakra patterns of ārohana and avarohana were recognised and they were suitably combined with non-vakra avarohanas or ārohanas and new vakra ragas thus formulated Thus s g r g m p d p s (Begada) and s r g m p d p n s (Nīlāmbarī) are beautiful vakra-ārohana patterns; and s n p m r g m r s (Gaula) and ṡ n d n p m g r s (Dīpaka) are beautiful vakra-avarohana patterns Umābharanam and Jananjanī were thus evolved

There are instances of minor vakra ragas having suggested other interesting vakra ragas The Kathana kutuhalam (s r m D n g p s — s n d p m g r s — 29) was suggested to Patnam Subrahmanya Iyer by the Kṛitī Āvarākutadyamai tochu of his Guru Mānambuchāvaḍi Venkatasubbayyar The raga of this kṛitī is Kutuhalam (s r m n d p n s — s n d p m g r s) and is also a janya of the 29th mela Likewise the raga Svaravedī immortalised in the song *Adugo koluvaiyunnādu* was suggested by the raga Svarāvalī Both are janyas of the 28th mela and the ārohana of both is the same (s m g m p n d n s) While the avarohana of Svarāvalī is s n p d m g r s, that of Svaravedī is ṡ n d n p m g s

The fact that many of the resultant ragas mentioned above are not mentioned in the medieval works on music is proof of their later origin in the manner mentioned above.

CHAPTER V

MURCHHANĀKĀRAKA MELAS

Of the 72 melas of South Indian music, if will be found that 56 melas yield new scales by the application of the process of modal shift of tonic. These 56 may be styled *Murchhanākāraka melas*, i.e., melas which are able to generate or produce murchhanās by this process. In the case of the remaining 16, it will be found that whichever note is taken as the tonic note, no satisfactory mela results. Such scales are characterised by either (1) diminished fifth, (2) unmusical intervals, (3) four successive semitones; or (4) one of the sapta svaras going unrepresented. These may be styled *Amurchhanākāraka melas* or sterile melas. In the chart, on pages 64 and 65 the barren melas are marked with a straight line against them. In the case of the Murchhanākāraka melas, the serial numbers of the resultant scales are given against each mela.

The process of modal shift of tonic applied to janya ragas results in many interesting janya ragas, some of them known and named and some unknown and unnamed. On the analogy of the murchhanākāraka melas, ragas producing new ragas by the shift of the tonic note in them might be styled Murchhanākāraka rāgas and the rest Amurchhanākāraka rāgas.

It is the process of modal shift of tonic that suggested the series of Vikṛta panchama melas, i.e., melas with a reduced or diminished Panchama. The nishāda murchhanās of Sankarābharana and Māyāmālavagaula result in such scales. The same process applied to Bhairavi results in a new series of 5184 sankīna melas. The melodic minor scale of European music is a sankīna mela. These misra mela are anticipated in the combinational jātis of the *Sangita Ratnākara*,

Graha Bheda Pradarsini Chart

Note The numbers mentioned in the svara columns against the name of each mela show the serial numbers of the melas that result when the particular note of the basic scale is taken as the tonic note. The blanks against a mela indicate that with such notes as tonic notes no perfect mela is possible.

Of the 56 Murchhanākāraka melas there are —

20, which are capable of yielding only one scale each by the process of modal shift of tonic,

18 melas yielding 2 scales each

12 melas yielding 3 scales each

6 melas yielding 5 scales each

Thus of the 56, Ekamurchhanā melas number 20.

Dvīmurchhanā melas number 18

Trimurchhanā melas number 12 and

Panchamurchhanā melas number 6

GRAHA BHEDA

SUDDHA MADHYAMA MELAS

Basic Scale of Mela

The scales that result with the
new tonic note

	s	r	g	m	p	d	n
1 Kanakangi	51						
2 Ratnangi	53		19				
3 Ganamurti	54		55				
4 Vanatpati			25				
5 Manavati			61				
6 Tanarupi							
7 Senavati	63					17	
8 Hanumatodi	65	18	20			29	22
9 Dhenuka	66		56			35	
10 Natakapriya		64	26				23
11 Kokilapriya			62				
12 Rupavati							
13 Gayakapriya	69						
14 Vakulabharanam	71		21				58
15 Mayamalavagaula	72		57				
16 Chakravakam			27				59
17 Suryakantam		7	63				
18 Hatakambari		43					
19 Jhankaradhvani					2	53	
20 Nathabhanjani		29	22	8	65	28	
21 Kiravani			58	14	71		
22 Kharaharapriya	8	65	28	20			29
23 Gaurimanohari	10		64	26			
24 Varunapriya				32			
25 Mararanjani				4			
26 Charukesi			23	10			64
27 Sarasangi			59	16			
28 Harikambhoji	20		29	22	8		65
29 Sankarabharanam	22	8	65	28	20		
30 Naganandini		44		34			
31 Yagapriya							
32 Raga'adhami			24				
33 Gangevabhushani			60				
34 Vagadhisvari			30		44		
35 Sulini		9	66		56		
36 Chalantani		45					

PRADARSINI : CHART

TRATTI MADHYAMA MELAS

Basic Scale on Male The scales that result with the
 applied new tonic note.

s r g m p d n

37	Salagam			
38	Jalarnavam			
39	Jhalavarali			
40	Navaneetam			
41	Pavani			
42	Raghupriya			
43	Gavambhodhi			18
44	Bhavapriya	34		30
45	Subhapanthuvarali			36
46	Shadvidhamargini	70		
47	Suvarnangi			
48	Divyamani			
49	Dhavalambai			
50	Namanarayani			
51	Kamavardhani			1
52	Ramapriya			
53	Gamanasrama	19		2
54	Visvambari	55		3
55	Syamalangi		3	54
56	Shanmukhapriya	35		66
57	Simhendiamadhyamam		15	72
58	Hemavati	14		21
59	Dharmavati	16		27
60	Nitinati		33	
61	Kantamam		5	
62	Rushabhapriya		11	
63	Latangi		19	7
64	Vachaspati	26		23
65	Mlechhakalyani	28	20	20
66	Chitrambari		56	35
67	Sucharitra			
68	Jyotisvarupini			
69	Dhatavardhani			13
70	Nasikabhushani			46
71	Kosalam	21		58
72	Resikapriya	57		14

From the preceding Table it is seen that —

1 The total number of useful scales that can be derived from the 72 melas by the process of modal shift of tonic is 122

(N B The six svaras of each of the 72 melas taken as the tonic note should yield (72×6) 432 mūrchanās. Since 16 of the 72 melas are sterile, 96 mūrchanās become *prima-facie* impossible. Of the remaining number, 214 mūrchanās are useless, since they are found to possess one or the other of the four defects pointed out in Para 1 on P 62. Thus the workable and usable mūrchanās are only 122)

2 Of the 122 mūrchanās,

the rishabha mūrchanās	number	17
the gāndhāra	„ „	20
the madhyama	„ „	24
the panchama	„ „	24
the dhaivata	„ „	20
the nishāda	„ „	17
		<hr/>
		122
		<hr/>

3 The number of panchama mūrchanās is equal to the number of madhyama mūrchanās

This is so, because, if of two scales a and b , a 's panchama mūrchanā results in b , b 's madhyama mūrchanā will result in a

4 The number of gāndhāra mūrchanās is equal to the number of dhaivata mūrchanās

This is so, because, if of two scales x and y , x 's gāndhāra mūrchanā = y , y 's dhaivata mūrchanā will be = x

5 The number of rishabha mūrchanās is equal to the number of nishāda mūrchanās. The reason for this is the same as above. That is, of two scales m and n , if m 's rishabha mūrchanā = n , n 's nishāda mūrchanā will be = m .

It will be noticed here that the number of samvādi svara (pa and ma) mūrchanās is the highest; next come the anuvādi svara (ga and dha) mūrchanās. Lastly the ri and ni mūrchanās.

What has been mentioned above regarding the relative character of the pa ma mūrchanās, ga - dha mūrchanās and ri - ni mūrchanās holds good in the case of janya rāgas as well. Thus Mohana's Panchama mūrchanā results in Suddha sāveri raga and Suddha sāveri's madhyama mūrchanā results in Mohana. See the table on pp 68-69 relating to Mūrchanākāraka janya rāgas.

6 If the basic scale consists of tones and semitones alone, its resultant scale also will consist of tones and semitones. If the basic scale consists of tones, semitones and intervals higher than a tone, the resultant scale or scales will also consist of similar intervals.

It will be found that in the scales resulting by modal shift of tonic, the total number of tones, semitones or augmented intervals as the case may be, will be the same between the basic scale and its resultant mūrchanās.

In the table on the next two pages, some of the well-known janya rāgas are taken and the rāgas that result by the shift of the tonic note are presented. Column 1 gives the name of the basic rāga. The svara that is taken as the tonic note and the resulting rāga therefrom are indicated below the concerned svara and along the line of the basic rāga.

MURCHHANĀKĀRAKA

Name of the basic raga	Serial No of its mela	Its ārohana and avarohana	Ragas resulting	
			s	r
Dhanyasi	8	sgmpns - sndpmgrs		
Desya todi	8	sgmpnds - sndpmgrs		
Suddha todi	8	sgmdns - sndmgis		
Vasanta	17	sgmdns - spdmgrs		
Malkaus	20	sgmdns - sndmgs		
Udaya	22	sgmpns - sndpmgs		
revichandrika	22	sgmpns - sndpmgs		
Madhyamāvatī	22	sgmpns - sndpmrs		Malkaus
Pūshpalatika	22	sgmpns - sndpmgs		Suddha todi
Sālagabhairavi	22	sgmpns - sndpmgs		Dhanyasi
Abhogī	22	sgmdns - sdmgrs		
Abheri	22	sgmpns - sndpmgs		
Mohana	28	sgpds - sdpgis		Madhya- māvatī
Udaji	28	sgpds - sndpgs		
Nāgasvarāvalī	28	sgmpds - sdpmgs		
Kedāragaula	28	sgmpns - sndpmgrs		
Yadukula-	28	sgmpds - sndpmgs		
kāmbhojī				
Kāmbhojī	28	sgmpds - sndpmgs		
Kuntalavarālī	28	sgmpds - sndpmgs		
Hamsadhvani	29	sgpns - sndpmgs		
Suddhasāveri	29	sgmpds - sdpmrs		Udayaravi- chandrika
Ārabhi	29	sgmpds - sndpmgrs		Ābheri
Budhananohari	29	sgmpgs - spmgs		
Ramani	63	sgmpns - sndpmgs		
Mohanakalyāni	65	sgpds - sndpmgs		

JANYA RAGAS

by the shift of the tonic note				
g	m	p	d	n
Kāmbhojī				Sālagabhairavī
	Ramanī			Pushpalatikā
Suddha sāverī	Udaya-ravichandrika		Mohana	Madhyamāvatī
Mohana	Madhyamavatī	Malkaus		Suddhasāverī
	Suddha sāverī	Udaya-ravichandrika		Mohana
	Valajī			
Mohana-kalyāṇī	Kedāragaula			Ārabhī
Malkaus		Suddha sāverī	Udayaravichandrika	
	Hamsadhvani	Ābhogī		
	Ārabhī	Ābherī		
	Bilāharr		Desya tōḍī	
	Budha-manoharī			
	Mohana	Nāgasvarāvalī		
		Madhyamavatī	Malkaus	
	Mohana-kalyāṇī	Kedāragaula		
		Kuntalavaiālī		
		Vasanta		
		Ārabhī		

Indian music is a dynamic system of music. Its tone system is evolved on the basis of aesthetic laws. It is logically and mathematically accurate and conforms to the truths of *anubhava* and *lakshya*. In the case of those notes which always occur as shakes, it will be noticed that the mean point of the *kampita* will coincide with one of the 22 *sruti sthānas*. In some ragas, *srutis* other than the 22 occur, but such notes are regarded only as varieties of the contiguous *srutis*.

The *sthāyi* consists of ten twins of *sruti* intervals in addition to *sa* and *pa*. The notes constituting each twin are themselves separated by the interval of a *pramana sruti*. The twins however are found to be alternately separated by the intervals of 90 cents and 70 cents or *pūrṇa sruti* and *nyūna sruti* respectively. Thus from *sa* to *ekasruti ri* is equal to 90 cents or a *pūrṇa sruti*, but from *ekasruti ri* to *dvīsruṭi ri* is equal to 22 cents or a *pramāṇa sruti*.

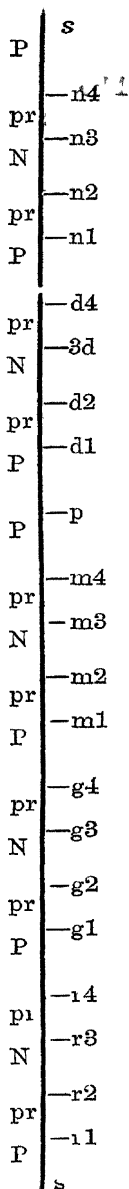
Again from *dvīsruṭi ri* to *tīsruṭi ri* equals 70 cents or *nyūna sruti* but from *tīsruṭi ri* to *chatussruti ri* equals 22 cents or a *pramāṇa sruti*.

Likewise the interval from *chatussruti ri* to the first *sruti gāndhāra* equals a *pūrṇa sruti* but from this *gāndhāra* to the *gāndhāra* immediately above is a *pramāṇa sruti* and so on. The illustration given on the next page explains these things clearly. It will be noticed that the notes *sa* and *pa* are separated from the notes immediately above or below them by the interval of a *pūrṇa sruti*.

Thus this kind of progression may be styled a *mixed progression* or *alternate progression*.

$10 \times 22 = 220$, altogether 1200 cents)

pr = ~~Pramāna~~ sruti 22 cents ($\frac{81}{80}$)



The following table of *arithmetical means* and *harmonic means* will also be of interest.

The arithmetical mean between *s* and *ś* $= \frac{1 + \frac{2}{3}}{2} = \frac{5}{6}$

or *pañcama*

s and *p* $= \frac{1 + \frac{3}{4}}{2} = \frac{7}{8}$

or *antara ga*

s and *antara ga* $= \frac{1 + \frac{5}{4}}{2}$

$= \frac{9}{8}$ or *chatussrutī ri*

s and *trīsrutī dha*

$= \frac{1 + \frac{5}{3}}{2} = \frac{8}{3}$

or *suddha ma*

s and *suddha ma* $= \frac{1 + \frac{4}{3}}{2}$

$= \frac{7}{6}$ a note below the

komala sādharāna ga

s and *kaisikī nī* $= \frac{1 + \frac{2}{3}}{2}$

$= \frac{5}{6}$ a note approxima-

ting to *pratī ma*

s and *tāra sthāyī antara*

ga $= \frac{1 + \frac{5}{2}}{2} = \frac{7}{4}$ a note

below the *komala*

kaisikī nishāda

N B — The notes bearing frequencies of septimal ratios $\frac{7}{4}$ $\frac{7}{5}$ and $\frac{7}{6}$ result as arithmetical means between the pairs mentioned above)

The harmonic mean between s and s = $\frac{4}{3}$ of suddha ma	
„	s and p = $\frac{6}{5}$ or sādharana ga
„	s and antara ga = $\frac{10}{9}$ or tīsruti rīṣhabha,
„	s and tīsruti dha = $\frac{5}{4}$ of antara ga
„	s and tara panchama = $\frac{3}{2}$ or pa
„	s and atī tara sa = $\frac{8}{5}$ of suddha dha.

Arohana patterns of the Shadava, Audava and Svarantara types

Rāgas resulting by the process of modal shift of tonic may be classified as follows —

1 Those wherein the new rāgas reveal themselves by playing the notes of the basic scale with the identical frequencies, e.g. Harikāmbhojī and Sankarābharaṇa, Valaṇṇi and Ābhogī

2 Those wherein the new rāgas reveal themselves only when the pitch of a note or two of the basic scale is either slightly diminished or augmented, e.g. Sankarābharaṇa and Kharaharapriya

Although the tambura is kept sounding all the time, still the new rāgas reveal themselves because of the ranjaka prayogas characteristic of the resulting rāga, though played upon the identical svarasthānas of the basic rāga. It should be noted that in the resulting scale, the nyāsa svaras and amsa svaras will also be different from those of the basic scale.

For the purpose of gāhā bheda rāgas may be classified into —

1 Those wherein all its svaras give rise to new rāgas, e.g. Mohana. Such rāgas may be styled *sarva svara murchhanākāraka rāgas*.

2 Those wherein some of its svaras alone give rise to new rāgas, e.g. Kīravani. Those rāgas may be styled *katipaya svara murchhanākāraka rāgas*. The murchhanākāraka melas come only under this category.

In the process of modal shift of tonic, a sampūrṇa ārohana will give rise to a sampūrṇa ārohana, a shādava ārohana, to a shādava ārohana, an audava ārohana to an audava ārohana and a svarāntara ārohana, to a svarāntara ārohana. Barring the sampūrṇa ārohana, wherein the question of varja svara does not arise, in the other resulting patterns, the varja svara or svaras will be found to differ.

It may also be noticed that if the notes of the basic scale admit of being grouped into samvādi pairs i.e. shādja-panchama or shādja-madhyama, the notes of the resulting scales also will admit of this grouping. In scales like Sankarābhairava and Kharaharapriya, the sa pa pairs occur consecutively i.e. sa pa, ri-dha, ga-ni and ma sa (tāra shādja). In scales like Nāgasvaravali, the sa pa and sa-ma pairs will be found to come alternately, i.e. sā pa, ga dha, ma sa (tāra shādja) and pa - sa (tāra shādja).

The table on P. 76 gives the patterns of the ārohanas that would result by the application of the process of modal shift of tonic to the possible types of shādava and some of the audava and svarāntara patterns. Known patterns of shādava, audava and svarāntara types are chosen as the basic scales, to facilitate understanding. Thus for a shādava type, the Kāmbhoji pattern s r g m p d s is chosen, for an audava type, the Mohana pattern s r g p d s is chosen and for

a svarāntara type, the Navarīśakannāda pattern *s g m p s* is chosen. A shāḍava pattern will give rise to five other shāḍava patterns, an audava pattern will give rise to four other audava patterns, and a svarāntara pattern to three other svarāntara patterns. The basic scale chosen in each case is printed in thick types. In the shāḍava table, the five lines following the basic ārohana, represent respectively the ārohana patterns that would result by taking the *ri*, *ga*, *ma*, *pa* and *dha* as the tonic note. If the ārohana *s i g m p n s* (2nd line) is taken as the basic ārohana, the five lines following this line, will give the ārohana patterns that would result by taking its *ri*, *ga*, *ma*, *pa* and *ni* as the tonic note and so on. The same thing holds good in the case of the audava and svarāntara patterns.

The above patterns when read from right to left will give the corresponding results for the avārohana patterns.

The above results are given on the basis of mere solfa names. But when applied to specific melas, it will be found that in some cases, two consecutive notes of the basic ārohana pattern, instead of giving rise to two consecutive notes in the resulting pattern may give rise to two notes which happen to be the komala and tivra varieties of the same note. For example the ārohana *s g m p d n s* (janya of the 29th mela) results in *s i m m d n s* (suddha ma aud prati ma) when its nishāda is taken as the tonic note. Since the notes *ga* and *pa* are not represented in this pattern, this ārohana virtually becomes an audava type of ārohana. Thus this presents a remarkable instance of a shāḍava ārohana giving rise to an audava pattern in the process of modal shift of tonic. Likewise the *dha* mūrchanā of *s r g m p d s* from the 26th mela results in *s g m d d n s* and so on.

Shadava Arohana

s i g m p d s r g m p d s r g m p d s

s i g m p n s
 s i g m d n s
 s r g p d n s
 s i m p d n s
 s g m p d n s
 s r g m p d s
 s i g m p n s
 s r g m d n s
 s i g p d n s
 s i m p d n s

Audava Arohana

s r g p d s r g p d s r g p d

s i m p n s
 s g m d n s
 s r m p d s
 s g m p n s
 s i g p d s
 s r m p n s
 s g m d n s
 s i m p d s

Svaīntara Arohana

s g m p s g m p s g m p

s i g d s
 s i p n s
 s m d n s
 s g m p s
 s i g d s
 s i p n s

Examples of other audava and svaīntara patterns
may be worked out similarly

CHAPTER VI

Mela, Mela Paddhati and Mela nomenclature

The ancient mūrchanās are the original sources for the concept of a mela. Mūrchanās were sampūrṇa scales and their notes bore a defined pitch in relationship to the fundamental note. The ancient harp like vina was tuned to the scale *sa grāma*. This vina was played on open strings and the different mūrchanās were played by shifting the tonic note from one string to another according to the scale intended to be played. The mūrchanās of *ma grāma* and *ga grāma* were obtained by tuning the vina in each case to the particular grāma. Whereas the mūrchanās were sampūrṇa, jātis were either sampūrṇa, shādava or audava. Jātis were described from the point of view of 13 lakshanas, but none of these lakshanas contemplated gamakas as understood in later times.

For many centuries rāgas were described in terms of mūrchanās and jātis. With the advancement of musical knowledge and with the coming into existence of more and more rāgas, the necessity was felt for the classification of rāgas based on affinity to certain fundamental scales. Various classifications like the *pan tīram* system and *rāga-rāgini parivāra* system were conceived. But these systems of classification were not based on any definite principles. A classification which would facilitate the remembrance of the svaras taken by the rāgas was needed and the *janaka-janya* system of classification which came into existence during the early medieval period was adopted by all.

Lochana Kavi's *Rāga taranīni* is the first work to mention rāgas under the categories of primary rāgas and derivatives. According to the astronomical details furnished by the author in the colophon to his work, he must have lived in 1160 A. D. He mentions the following 12 thāts, Bhairavi (sa grama scale) Todī (8), Gaurī (15), Karnāta (28), Kedāra (29), Imān (65), Sāraṅga, Megha, Dhanāsari (51, Puryā Dhanāsari), Pūva (66), Mukhāri (20), and Dīpaka, and classifies his 75 janya ragas under them. The serial numbers given next to the names of the thāts indicate the corresponding melas of South Indian Music.

The *Saṅgita sāra* of Vidyāranya (1320 - 1380) is the next work to enumerate the rāgas under the categories of melas and janyas. He mentions the following 15 melas: Natta, Guṇai, Varātika, Srīrāga, Bhairavi, Sankarābharana, Āhiri, Vasantabhairavi, Sāmanta Kāmbodī, Mukhāri, Suddhāramakriya, Kedāragauda, Hijuṇi, Desākshī, and classified his 50 janya rāgas under them.

(Some scholars are of opinion that Lochanakavi lived in the 14th century. This view seems to be correct in view of the fact that he mentions certain ragas which come to the notice of musical history only in later times. In this case, Vidyāranya will have to be deemed the originator of the janaka-janya system.)

Ramāmātya, in his *Svaramelakalānidhi* mentions the following 20 melas: Mukhāri, Mālavagaula, Srīrāga, Suddhāramakriya, Kannaḍagaula, Nādarāmakriya, Ritigaula, Kedāragaula, Hijuṇi, Kāmbhoṇi, Hindol, Sāraṅgānāta, Desākshī, Suddhanāta, Āhiri, Suddha varātī, Vasanā

bhairavi, Sāma varāṭi, Revagupti, Sāmanta He classified his 64 janya rāgas under these melas

Somanātha in his *Rāga vibodha* mentions the following 23 melas — Mukhāṇi, Revagupti, Sāmavarāṭi, Todī, Nādarāmakī, Bhairava, Vasanta, Vasantabhairavi, Mālavagaula, Ritigaula, Abhira, Hammira, Suddha varāṭi, Suddharāmakri, Sṛnāga, Kalyāṇi, Kāmbodhi, Mallāṇi, Sāmanta, Kainātagaula, Desākshi, Suddhanāṭa, Sāraṅga He classified his 76 janya rāgas under them

In all these cases anything like a distinctive character is not noticeable for a mela. Many janya rāgas were given the status of melas. Ahobala in his *Saṅgīta pārijāta* classified his melas into pūṇa (samplūna) melas, shāḍava melas and audava melas. Many varja rāgas figure as melas in the *Chaturdandi prakāśikā* and the *Saṅgīta sārāmṛta*. This nebulous concept of a mela continued till even the middle of the 18th century. The idea that a mela ought to be krama-sampūṇa in its ascent and descent and that it should take the identical suddha-vikṛta svaras in its ārohana and avārohana emerges for the first time about the middle of the 18th century. The Kanakāṅgi Ratnāṅgi paddhati, mentioned for the first time in the *Saṅgraha chudāmaṇi*, has incorporated this idea and this marks the final stage of the evolution of the concept of mela.

Mela Paddhati

The first lakshanakāṛi to think of a scheme of melas is Somanātha. In his *Rāga vibodha*, he formulated a scheme of 960 melas, based on 7 suddha svaras and 15 vikṛta svaras. Ultimately he gave up the scheme as being too complicated for practical purposes. Venkatamakhī was indebted to

Somanātha for the idea of a scheme of melas. He profited by the latter's difficulties and evolved a workable scheme of 72 melas based on svaras instead of śrūtis. Ahobala in his *Sangita pariṣāta* (1660) formulated a scheme of melas based on 7 suddha svaras and 22 vikṛta svaras. His melas numbered 11,340. Later in the 18th century, the author of the *Melādhikāra Lakṣhaṇa* propounded in his treatise an ingenious scheme of 4624 melas taking the 24 śrūtis of an octave as svarasthānas. After all these struggles, the scheme of 72 krama-sampūrṇa melas was ultimately adopted as sound and this mela paddhati has come to stay.

It may be mentioned in passing that in recent times attempts have been made to expand the scheme of 72 melas into 108, by including the possible 36 vikṛta panchama melas 1 e melakartas taking both the madhyamas, the prati madhyama being sung with the solfa letter *pa*. Since these 36 melas lack the perfect fifth or panchama, their utility will be a matter of doubt. This further militates against the concept of *pa* as an avikṛta svara. If a janya rāga is to be classed under any one of these 36 vikṛta panchama melas, it should take both *ma* and *pa* (1 e the two madhyamas), the notes being represented in the ārohana or avarohana or both taken together. Janya rāgas not taking these two madhyamas will come under the present 72 melas.

The following scheme may be adopted for these 36 vikṛta panchama melas

The 36 melas may be grouped under six chakras, each chakra taking within it six melas. Besides shadja, all the 36 melas take the two madhyamas, the sharper variety of *ma* being sung with the letter *pa* though this is immaterial

for the purpose of instrumental music. The rishabha-gān dhāra varieties change from chakia to chakia, whereas the dhaivata nishāda varieties change from mela to mela, as in the scheme of 72. In order that the serial numbers of the chakias may be readily known, we may requisition the use of the katapayādi formula and name them thus

<i>Geya</i>	XIII	73-78
<i>Vāyu</i>	XIV	79-84
<i>Māyā</i>	XV	85-90
<i>Toya</i>	XVI	91-96
<i>Chhāyā</i>	XVII	97-102
<i>Jaya</i>	XVIII	103-108

The six melas within a chakra can be respectively represented with the syllables *pa*, *sri*, *go*, *bhu*, *ma*, *sha*. Thus *Geya-pa* will be the 73rd mela, *Geya-sri* the 74th, *Geya-go* the 75th, *Geya-bhu* 76th, *Geya-ma* 77th and *Geya-sha* 78th and so on. The first mela in this scheme or the 73rd mela in the scheme of 108 will be the result of the fusion of the Kanakāṅgi and Sālagam but without the panchama svara, the second mela in this scheme or the 74th mela in the scheme of 108, will be the result of the fusion of the Ratnāṅgi and Jalārnavam minus the panchama svara and so on.

The serial number of any vikṛta panchama mela is obtained by the formula,

$$(p + u) 2 - 3p$$

where *p* is the serial number of the pūva mela and *u* is the serial number of the corresponding uttara mela

Thus $(8+44) 2-24=80$ which is approximately the mela of gāndhara grāma and $(22+58) 2-66=94$ which is approximately the mela of the madhyama grāma and so on

The *Aṣṭottara sata melas* will thus consist of *three parts*—

(a) the notes, shadja, suddha madhyama and panchama being constant in the first part (chakras I - VI and melas 1 - 36),

(b) Shadja, prati madhyama and panchama being constant in the second part (chakras VII - XII and melas 37—72),

(c) Shadja, suddha madhyama and prati madhyama i.e. vikṛta panchama being constant in the third part (chakras XIII - XVIII and melas 73—108)

Another scheme of 5184 (72×72) melas has also been propounded and, this is described in the author's book, *The Flute* (Second edition),

In the scheme of 5184 suddha misra melas, whereas the serial number of any one of the present 72 melas is found by the formula,

$$72(n-1) + n$$

already referred to on P 10, the serial number of any one of the misra melas is found by the formula —

$$72(n_1-1) + n_2$$

wherein n_1 stands for the serial number of the ārohana mela and n_2 stands for the serial number of the avarohana mela

Thus the serial number of the *Kohila - Gauri* mela will be $72(11-1) + 23$ i.e. $720 + 23 = 743$

Where a serial number is given and the form of the mela is desired to be known divide the given number by 72 and add one to the quotient. This resulting number gives the serial number of the ārohana mela and the remainder, the serial number of the avarohana mela.

Thus if the given number is 1604, divide it by 72. The quotient is 22 and there is a remainder 20. Thus the mela takes $(22 + 1 = 23)$ Gaṇīmanohari in the ārohana and Nāṭabhairavi in the avarohana.

Where there is no remainder, do not add one to the quotient. In such a case the quotient number will itself stand for the ārohana mela and Rasikapriya, the last in the scheme of 72 will be the avarohana mela.

Thus let the given number be 720. When this is divided by 72, we get 10 and there is no remainder. The form of this mela is *Nāṭaka-Rasika* i.e. taking Nāṭakapriya in the ārohana and Rasikapriya in the avarohana.

Mela Nomenclature

It may be of interest to note that the names of some of the modern melas figure in ancient literature. The *Brhaddārkama 'Purāṇa*, the latest of the upa Purāṇas, mentions *Chakravāki*, as a dāśi rāga of Mallāra and *Rūpavati*, as a rāgini of Gāndhāra. The names Todi, Bhairavi, Sankarābharaṇa and Varāṭi occur in the *Saṅgita Ratnākara* and a few other early works. The name Mālavagaula is seen in the *Saṅgita Makaranda* of Nārada. This raga under the slightly altered form of Mālavigaula figures in the songs of the Tāllapākam composers (15th century). Of the names figuring in the asaṃpurna mela paḍḍhaṭi, the names

Velāvali, Sāmanā, Desākshi and Rāmakriya occur in the *Saṅgita Ratnākara*, *Saṅgita Samaya Sāra* and *Saṅgita Makaranda*

The *Chaturdandi Prakāsika* of Venkatamakhi merely explains the scheme of 72 melas and does not attempt a nomenclature for them. It is but natural that the author should have done so, since he visualised only the remote possibilities of a good number of his melas. He mentioned the serial numbers in his scheme for the current melas of his time, thus he mentions Gaula as the 15th and Kāmbhoji as the 28th and so on. The names of his 19 melas do not bear the *katapayādi* prefixes.

The 72 melas continued without a complete nomenclature even till the time of the *Saṅgita Sārāmṛta* (1735 A D). Taking the clue from the earlier scholars of naming a mela from a well-known janya rāga emanating from it, a scholar sometime after 1735 A D enunciated the Kanakāmbari-Phena dyuti nomenclature. This is the earlier Kanakāmbari nomenclature and many of the mela names therein did not have the *katapayādi* prefixes. The names of a few melas however accidentally conformed to the *katapayādi* formula. The *Kanakāṅgi-Ratnāṅgi* nomenclature then came into existence with the added merit of conforming to the *katapayādi* requirements. Since this system incorporated within it the *krama sampurna ārohana* and *avarohana* and maintained the homogeneous character of the svaras in the ascent and descent of the mela, this scheme was accepted as sound by all scholars and composers. Seeing the advantage of the *katapayādi* prefixes for the mela names, a later scholar improved the earlier Kanakāmbari nomenclature by introducing *katapayādi* pre-

fixes where necessary. The names of some melas were however bodily changed in this later Kanakāmbari nomenclature. Bhairavi mela was rechristened as Nṛṛitigaula mela and Kāmbhoji mela was rechristened as Haṁkedāragaula. Even this later Kanakāmbari nomenclature underwent some change in the hands of Subbarāma Dikshitar who in his 72 Rāgāṅga Rāgamālīka chose to call Vāṭivasantabhairavi as Vāyuvasantabhairavi and Toyavegavāhini as Tapovegavāhini and Sāntakalyāni as Matikalyāni. The Kanakāṅgi-Ratnāṅgi nomenclature has continued sacrosanct ever since. It is this nomenclature that is used in the 72 mela rāgamālīkā of Mahā Vaidyanātha Iyer.

It is evident that the Kanakāṅgi Ratnāṅgi nomenclature is the creation of Govindāchārya. The language adopted by him in this portion of his *Saṅgraha chūdāmaṇi* makes one conclude that he had his views examined by some of his contemporaries and that they approved of the same. Both Tyāgarāja and Syāma Sāstri seem to have accepted his paddhati. Govindāchārya was a samasthāna vidwan in the court of Tanjore and lived in Kāka vattāram (காகவட்டாரம்). He was a Mahiatta Brahmin of the Smārtha Desastha sect and had the title *Akalanka*.

The reputed work *Svarārṇavam*, said to have been given to Tyāgarāja by the Divine sage, Nārāda in the guise of a sanyāsin, is said to contain the following nomenclature for the 12 svarasthānas, beginning from shadja. The names are themselves suggestive of their serial numbers. 1 Soma, 2 Drik, 3 Anala, 4 Veda, 5 Bāna, 6 Rasa, 7 Marut, 8 Vasu, 9 Ankam, 10 Dik, 11 Rudra, 12 Āditya.

The svaras taken by the rāgas are said to be referred to by these names in this work.

CHAPTER VII

Musical laws, facts and phenomena known to the Indian musicologists of ancient and medieval times

The subject of *gāndharva tattva* or musicology can be divided into three parts —

1) That part which has a direct bearing on practical music and performance like —

- (a) the lakshana of rāgas, tālas and musical forms;
- (b) technique of fingering in stringed, wind and percussion instruments,
- (c) technique of plucking and bowing in stringed instruments,
- (d) technique of blowing and tonguing in wind instruments,
- (e) technique of striking as in jalatarangam (udaka vādyam) and gettu vādyam

2) That part which has an indirect bearing on practical music and performance like —

- (a) musical prosody,
- (b) physiological acoustics,
- (c) the acoustics of concert halls,
- (d) subjective and objective factors that contribute to the creation of a musical atmosphere in a concert hall,

A knowledge of this branch of musicology will help one to give a better performance and instil self-confidence

3) That part which has no bearing on musical performances as such

Topics like

- (a) Music and Mathematics,
- (b) Muichhanākāriaka melas and Amuichhanākāraka melas,
- (c) Comparative music,
- (d) Musical iconography,
- (e) Musical numismatics,
- (f) Musical therapy,
- (g) Geographical factors and their influence on the character and growth of a country's music,
- (h) Music and Astronomy,

come under this head. A knowledge of this branch of musicology helps one to acquire musical culture. It generally widens his outlook. Topics included under 1 and 2 are grouped under the head Musicology General and the topics comprised in 3 under the head Musicology - Special.

In India all these three branches of musicology received due attention at the hands of lakshanakāriyas

Indians were the first to recognise the sapta svaras. They are also the first to evolve a solfa system *sa ri ga ma pa dha ni*. The European solfa system *doh, ray, me, fah, soh, la, si* dates only from Guido d' Arezzo (995 1050 A D)

The laws of consonance and dissonance were known to musicians in India from very early times. The tone system of India is evolved on the basis of *samvāditva* (consonance). The consonant and dissonant intervals and their *sruti* relationships are described by Bharata in his *Nāṭya Sāstra*. A note bearing the octave relationship to another note was said to have the *dviguna* character. How appropriate the term *dviguna* is, will be realised when we remember that octaves proceed by geometrical progression. The 22 *srutis* of ancient Indian music are sound from both the aesthetic and logical points of view. It might incidentally be pointed out that *rationalism* and *comprehensiveness* are two of the characteristic features of Indian music. Though at first sight, Bharata's method of expressing the values of intervals may seem to be lacking in precision, yet on a careful examination it will be found that his conclusions and methods are perfectly logical and accurate. His experiment relating to the *Dhruva vinā* and *chala vinā* and the significance of the *rida* at the end of each stage of experiment are worthy of special study. The ancient's appreciation of such intervals as the *pramāṇa*, *nyūna* and *pūṇa* *srutis* are irrefutable facts. The appropriateness of the name *antara* for the fifth harmonic note deserves attention.

The *sthira vinā* was an instrument kept mounted at a fixed place as opposed to the *chala vinā* which was carried from place to place by the player for performances.

The *sthira vinā* was tuned as follows —

- (a) When mounted and kept across the direction of the wind, some of the strings were tuned to octaves, some to consonantal notes and some to harmonics. When the wind blew

against such an instrument all the strings were set in vibration simultaneously, and the combined effect was salubrious and pleasing

(b) When mounted and kept along the direction of the wind, the strings were set in vibration successively. In this latter case, the strings were tuned to a known scale

We have a specific reference to the harmonics under the name of *svayambhu svaras* in the *Svaramelakalāndhī* of Rāmāmātya (1550) and the *Rāga Vibodha* of Somanātha (1609). The harmonics are *svaras* which emanate of their own accord on a stretched string when plucked. The name *antaṛa*, found in the *Nāṭya śāstra* testifies to the fact that the harmonics were perceived even 2000 years ago. It may be mentioned here, that this note is called *antaṛa gāndhāra* in South Indian music, although in the music of North India, it is called *tivra gāndhāra* by some and *suddha gāndhāra* by others.

The emotional effects of ragas are referred to in many ancient works. That a raga with a preponderance of *komala svaras* generally produced a sombre or sad effect and a raga with a preponderance of *tivra svaras* generally made a joyous impression was realised long ago. The principles underlying the *gāṇakāla* of ragas have also an emotional significance.

An analytical study of the different varieties of the flute mentioned by Śārṅgadeva in his *Saṅgita Ratnākara* shows that the 'inverse law' which plays a large part in wind instruments and stringed instruments was perceived centuries ago.

The method of deriving new scales by the application of the process of modal shift of tonic is as old as the grāma-mūrchhanā system. This phenomenon came to be known to Arab and Greek musicologists only at a later period. The chatuḍasa mūrchhanās were derived by the application of this process to the notes of the *sa grāma* and *ma grāma*. *Sa grāma*, it might be mentioned in passing is the primordial scale of humanity. It had two symmetrical tetrachords. The major diatonic scale of modern European music is the nishāda mūrchhanā of *ma grāma*. The process of modal shift of tonic was carried to its logical limits and this led to the discovery of many janya rāgas and sampūrṇa rāgas. The scheme of 72 melas is one of the happiest products of the application of this process. The first and the last melas in the scheme of 72 melakartas were obtained by taking the nishāda of Rāmakriyā (Pantuvārālī of South Indian music and the tivā madhyama parallel of Māyāmālavagaula) and the rishabha of Māyāmālavagaula as the tonic note respectively. This process applied to misra melas has led to the enunciation of the scheme of 5184 suddha-misra melas by the author. The melodic minor scale of European music is the 1604th scale in this scheme of 5184 suddha-misra melas.

It was realised that in the resulting scales, a note or two had to be slightly augmented or diminished in pitch in a few instances in order to get the correct pitch. The point is emphasised in the Tamil epic *Silappadikāram* (2nd century A. D.). It is pointed out therein that the player of the yāzh (i.e. harp) should be proficient enough to make these slight adjustments, wherever necessary. It should be remembered that at that period, as far as instrumental music (harp or the flute) was concerned, the instruments were tuned to

the suddha scale and other scales were produced by the shift of the tonic note. At present however this is not the case. With the emergence of the fretted vīṇā, all rāgas came to be performed to one ādhāra shadjā and the different notes were produced by placing the fingers on the relevant frets.

The small stick shown in the hands of the harp player in ancient sculptures was used for three purposes.—

- 1) to damp the low-pitched guts after they had been sounded

This was necessary as otherwise their continued vibration would prevent the notes of the subsequent music from being clearly heard.

(It is quite possible that the idea of the damper in the piano was suggested by this stick used by the ancient harpist in India).

- 2) to perform the gamaka called *meend*, *jāru* or glide by sliding the stick over the concerned string after it had been set in vibration
- 3) to place the stick at the proper point on the string before plucking, to get at the required augmented pitch a new nodal point being thus created

When a note of a slightly diminished pitch had to be played, the stick was placed at the proper point on the lower string.

Thus the necessity for retuning the required strings to a higher or lower pitch was obviated by this process.

This stick was also used occasionally to run over the strings at a stretch to produce the ārohana or avarohana gamaka, just like the technique adopted by the performer on the jalatarangam

In the hair page the phenomenon of new scales resulting by the application of the process of modal shift or tonic to a known scale was fully known. In recent times this process was applied to all the 72 melas and the results worked out. We are now in a position to classify the 72 melas under the heads of mūrchhanākāraka melas and amūrchhanākāraka melas

In later times, new ragas were obtained by flattening or sharpening one or more notes of a known scale by the interval of a semitone. Thus the Pantuvaiālī rāga was possibly obtained from Harikāmbhojī (Khamāj thāt of Hindusthānī music and the suddha scale of ancient Tamil music) by flattening the rishabha and dhaivata a semitone and sharpening the madhyama and nishāda a semitone. It is also possible that this rāga was obtained by taking the semitones above and below, shādja and panchama (the two consonant notes) along with the antara gāndhārīa

* The mūrchhanās, Ranjanī (Sankarābharana) and Asva-kṛānta (Kalyāṇī) of sa grāma furnished the suddha madhyama and prati madhyama parallels of one and the same scale. This fact was noticed and in later times suddha madhyama parallels of known prati madhyama rāgas and prati madhyama parallels of known suddha madhyama rāgas were worked out. Wellknown ārohana-avarohana patterns were taken and studied under different melas and thus a rich variety of janya rāgas obtained. Some interesting rāgas were also

obtained by the fusion of the ārohana of one rāga with the avarohana of another raga

The factors that contributed to the creation of a musical atmosphere in a concert hall were carefully studied. The *Kundali man darpanan*, a Sanskrit manuscript relating to dance, says that a sushka vādyā recital (solo recital) should precede a dance performance. The solo play of chenda as a prelude to the performance of Kathakali in the open air, is done not only for publicity but also for creating the musical atmosphere. The appearance of the Konangi (clown) at the commencement of a nritya nāṭaka (dance drama) sent the audience into roars of laughter. This incidentally helped to direct the attention of the audience to the coming play. Since the music for the dance of the Konangi was in Kāmbhojī rāga and its tessitura centred round tāra sthāyī shadjā, the requisite musical atmosphere for the enjoyment of the dance drama was also created.

Instrumentation is a subject of absorbing interest. It is more so with reference to the study of Indian musical instruments. The enriched tonal effect produced by the jivālī in the tambura and other stringed instruments is worthy of attention. The fact of the flageolet notes being heard at certain aliquot lengths of stretched strings was taken advantage of in fixing the frets in the vina.

The cycle of fifths referred to by Ahobala in his *Sangita Pārījāta* (1660) was known to Indian musicologists centuries before him. The cycle of fifths worked out in the light of modern knowledge helps us to realise more the perfect character of the Indian tone system.

CHAPTER VIII

The Evolution of Finger technique in Indian Instrumental Music

Instrumental music has played a prominent part in the evolution of the music of both the orient and the occident. Man became early conscious of the fundamental principles of musical science, through musical instruments. The monophonous voice was not of much help to him in practically working out and understanding the various musical laws and phenomena. The ancient harp helped the scholars to comprehend the nature of consonant and dissonant intervals, the frequency ratios of notes, the harmonic series and the method of deriving scales by the process of modal shift of tonic.

Except the key board type, all other types of instruments are fully represented in India. The Indian musician had no use for the key board type of instrument, since it gave only notes of fixed pitch and had no provision for the playing of the delicate quarter tones and subtle graces. It would indeed have been a surprise to students of comparative musicology, if the key-board type of instrument had developed in India.

India is perhaps the earliest country in the history of world-culture to realise the value of absolute music. The association of *musical instruments* with Divine Beings and Divine minstrels can be cited in proof of this statement. Instrumental music was held in great esteem from early times. Instrumental music was an indispensable accompaniment in recitals of vocal music. In the days when the tambura had not come into vogue and such instruments as

the chromatic pitch pipe and tuning forks were unknown and in the days when compositions were not sung to an ādhāra shadja as is done now, the value of instrumental accompaniment is obvious. The instruments not only gave the key note but also furnished the musical accompaniment. Vocal music and instrumental music have had a healthy reaction on each other from early times. The person with a gifted voice easily dominated the instrumentalist in early times. The latter tried to reproduce on his instrument all the nuances of the song and these conscious efforts at playing an embellished and polished music laid the foundations for the development of an elaborate finger technique, plucking technique, blowing technique and striking technique. The coming into existence of the metallic strings and frets opened up fresh possibilities and the instrumentalist was not slow in making full use of the new facilities. With the extended compass and the variety and richness of tone colour, at his disposal, the instrumentalist in his turn began to occupy an enviable position. The singers soon perceived the beauties of vina music and began to imitate the same. Thus the Gāyaka style and the Vainika style reacted on each other and with very good results.

The genius of India is fully reflected in the complex finger technique seen in her instrumental music. This technique is one of gradual growth and represents the accumulated wisdom of the instrumentalists of the past. Skill in finger technique is acquired after many years of practice. The play of those who have not acquired a command over finger technique will not be delightful. Their performances will be childlike in character. To perform classical compositions accurately one needs a high

degree of proficiency in finger technique To perform *manodharma sangita*, one needs even a higher degree of proficiency in this skill

The subject of finger technique admits of a four-fold treatment the technique relating to - (1) *tata vādyas* (chordophones) (2) *sushūta vādyas* (aerophones) (3) *Avanaddha vādyas* (membranophones) and (4) *Ghana vādyas* (autophones) The unequal lengths of the fingers seem to be designed by nature for developing an intelligent technique, which will help in playing in a graceful, neat and polished style Finger technique is the technique involved in applying the fingers to the strings, the finger-holes and the drum head There are special exercises to give strength to the fingers Finger technique has kept pace with the developments in music century after century Daring experiments in fingering were attempted by enterprising instrumentalists from time to time These experiments involved years of practice and at some stages, some of these pioneers gave up their new attempts as hopeless The *jāru style* of violin play now in vogue in South India is an instance in point When new instruments were invented or when improved patterns of existing instruments came into vogue, instrumentalists worked hard at these new devices and evolved the most satisfactory finger technique

With the exception of the *mridanga*, *tabla* and *pakhawāj*, the remaining percussion instruments do not admit of an elaborate finger technique These three instruments provide a delightful cross rhythmical accompaniment and contribute to the excellence of an Indian concert The rhythmical harmony provided by them is fascinating Some rhythmical syllables are played by damping fractional areas of the

drum-head with the hand. The late Mṛīdangam Nārāyaṇa-swāmī Appā was so alive to the responsive character of fingers, that he would not even grasp the door lintel of a railway carriage. He invariably asked one of his disciples to open the door of the carriage for him. The ghata an old instrument is even now used in South Indian concerts as an upa tāla vādyā (secondary rhythmic accompaniment). The hand, the wrist, the finger tips and finger nails are used in playing this instrument.

From their very nature, the ghana vādyas (cymbals) do not admit of any finger technique. The metallic plates or discs are merely struck and their rhythmical accompaniment is on the same footing as the accompaniment provided by the percussion instruments in European orchestras. But there have been instances of Jālā (cymbals) players, who gave rhythmic solos on this instrument. These solos were as captivating as the mṛīdangam solos heard in concerts of classical music.

An elaborate finger technique and blowing technique has been evolved for wind instruments like the flute and the nāgasvaram. The latter instrument is not more than 700 years old. In the nāgasvaram, semitones and quarter tones are produced by adjustments in the strength of blowing and not by partially opening the finger holes as in the flute. The fingering system of the flute of the ancient period is different from that of the modern period. Terms like *kampita*, *valita*, *mukta*, *ardhamukta* and *nipīḍita* are significant in relation to the finger technique of the flute. Single tonguing was in vogue from ancient times. Double tonguing, triple tonguing, quadruple tonguing, finger

strokes and cross-fingering are later developments. The technique of flute play made rapid strides, when the flute attained the status of a primary instrument. In wind instruments, the blowing technique is an important factor in the production of the nuances of music.

The finger technique of the vīna has a long history. In ancient literature, the word vīna was sometimes used to denote both the lute type and the harp type of instruments. In the harp type, a series of strings was stretched over an open frame. They were stretched between the sound-board and the arm. The strings were set in vibration by the fingers. Each string produced only one note. The strings were tuned to notes of *absolute pitch and to the fundamental scale. We come across the sapta-tantri vīna in the story of Guttīla the musician in one of the Buddhist Jātaka legends. The vīna with a finger board (without frets) and with one or two strings is seen in early sculptures and in the Ajanta frescoes. Whereas the harp type of vīna was held vertically and played, the lute type was held in an oblique posture and played. There were limitations to both these types of instruments. The longer strings of the harp vīna when struck gave a continuing note and such modern devices as the damper of the piano were unknown in those days. This continued vibration of the longer guts, as already referred to in the previous chapter, was a disturbing factor in the proper enjoyment of music. The *Silappadikāram* (சிலப்பதிகாரம்) refers to the four defects, *sempakai*, *ārppu*, *adīrvu*, *kūdam*.

In modern times the strings are tuned to relative pitch. A note of any pitch is taken as the adhara shadjā and the remaining strings are tuned accordingly. The ancients had a conception of absolute shadjā.

which every yāzh player should overcome. The same work (in கானல் வரி) also refers to terms like *vārtal* (வார்தல்), *vadittal* (வடித்தல்), *undal* (உந்தல்), *uraldal* (உறழ்தல்), *uruttudal* (உருட்டுதல்), and *teruttudal* (தெருட்டுதல்), significantly explanatory of the plucking and tuning technique.

The strings of the *svaiamandala*, another ancient instrument, were merely struck and played and so the question of an elaborate finger technique does not arise in the case of this instrument. The instrument was kept on the floor and played on open strings. *The invention of frets constitutes an important landmark in the evolution of the vina*. The number of strings was reduced and the playing of such gamakas as *kampita*, *līna*, *tīrīpa*, *valī*, *tribhinna*, *kurula*, *āhata*, *ullasita*, *pūrva dhāl* and *uttara dhāl* became an easy task. The plucking technique also developed side by side with the left hand technique.

Mittu (மிட்டு மீட்டு) is the term that signifies the act of plucking the strings in stringed instruments. There are technical terms to denote the various kinds of *mittu*. Where horn plectra are used, as in the *svarabat*, the technique is very simple. *Vina* playing is attended with an elaborate finger technique.

Types of mittu (மீட்டு ஜர்திகள்) used in *vina* play are —

Tarjanī mittu, plucking with the index finger

Madhyama mittu, plucking with the middle finger

Kanishṭhika mittu, (கனிஸ்திக் மிட்டு) striking the tāla strings upwards with the little finger

Lo mittu (also called *Kil mittu* கீழ் மீட்டு and *Uy mittu* உள் மீட்டு) striking the chanterelle string downwards with the forefinger

Veli mittu or *Mel mittu* striking the chanterelle string upwards with the forefinger

Pattu mittu (பட்டு மீட்டு) or *etouffe*, plucking the string with the forefinger and then gently stopping the vibration, with the middle finger, so as to produce a staccato sound

Vidupu mittu, letting the strings to vibrate after the *pattu mittu*

Periya mittu (பெரிய மீட்டு) plucking with some force so as to produce a loud tone

Sanna mittu (ஸன்ன மீட்டு), plucking the strings softly so as to produce a soft tone

Laya mittu or *Pakka mittu* striking the tāla strings upwards with the little finger, same as *kanishthika mittu*

Gotu mittu is a compound mittu and consists of a *lo mittu* and *laya mittu* done simultaneously

Kodi mittu, the effect herein is produced by placing the finger lightly on the sāraṇī string and then lifting it

Tunai mittu (துளை மீட்டு) the plucking of the chanterelle string alternately by the index finger and the middle finger. Also called *Kutai mittu* (குதைய மீட்டு)

Kūttu mittu (கூட்டு மீட்டு) plucking all the four playing strings from the anumandaram to the sāraṇī, with the index, middle and ring fingers at one stretch, for the sake of *melo-*

dic effect In this type of mīttu, the fingers are held closely together

Vidi mīttu (விடி மீட்டு) the occasional plucking of the maṇḍaram, paṇchamam and sārani strings individually for the sake of effect

Sruti mīttu, plucking the four playing strings by the forefinger at one stretch to give a harmonious effect

Kattiri mīttu (கத்திரி மீட்டு) plucking with index finger and the middle finger sharply one after another so as to produce a tremulous effect.

Sama mīttu (ஸம மீட்டு) or *Jodu mīttu* (ஜோடு மீட்டு) is the simultaneous plucking of the string upwards or downwards by the index finger and the middle finger, held closely together and producing the sound of the syllables, *Kra*, *Tra* or *Sri*

Tadar mīttu (தடை மீட்டு) where triplets or phrases after the pattern of a srotovaha yati like s r g, n s r g, d n s r g, have to be played, the earlier notes are played by the mīttu of the index finger and the last note by the mīttu of the middle finger

Idai mīttu (இடை மீட்டு), a lo mīttu followed by the stopping of the string with the middle finger and the silenced note being immediately reproduced by the plucking of the string with the middle finger This will in effect be a janta svara, the two notes being produced by a tarjanī mīttu and madhyama mīttu but separated by a period of viraṇṭi (silence or rest)

Svara mīttu a case wherein a passage is played with a separate mīttu for each note. This corresponds to the *svara vil* (ஸ்வர வில்) in violin play.

Sāhitya mīttu, a case wherein a passage is played with a separate mīttu for each phrase. This corresponds to the *sāhitya vil* (சாஹித்ய வில்) in violin play.

In his *Raga Vibodha* (chap. V), the author Somanātha explains the 20 technical terms for the varied aspects of the left hand technique of vīna play (*vīna vādana*) and gives a notation for them. Compared to the right hand technique the origin of the left hand technique can be assigned to a much earlier period.

The Telugu work, *Sangita sāra sangrahaṃu* (18th Century) mentions the ten mīttus: *śruti*, *tarjani*, *lo*, *veli*, *pattu*, *vidupu*, *tada*, *sama*, *katra* and *laya* as *dasapīānas*.

The vīna is now held in both the vertical and horizontal postures and played. In the former case, the length of the dandi of the instrument will be somewhat short. The performing in the higher octave on such instruments on all the four strings is relatively easy. On the vīna and the *gotuvādyam* one can play simultaneously in two octaves. This was not possible on the ancient harp-like vīna. Compositions like the *thāya*, help vīna students to acquire proficiency in *vattai mīttu*. Composers who were also *vainikas* wrote special types of compositions, to help vīna players to develop the finger technique of the left hand and the plucking technique of the right hand.

The European instrument, the violin, has been successfully adapted in South India. The earlier *pidivādyam* (பிடிவாத்யம்) style of play naturally gave way to the later pleasing *jāru vādyam* (ஜாருவாத்யம்) style of play. The new style of bow technique used for playing *tānas* on the violin is delightful. In some instruments of the North, the finger nails (and not the finger tips) of the left hand glide over or along the side of the playing strings.

Music in quick tempo and music in *varik* style were not possible on the ancient harp. Tirunilakantha Yāzhpānar's grievance that he was not able to faithfully reproduce the music of Tirugnānasambandar may be due partially to this. Sruti problems offered by new *rāgas* derived by the process of modal shift of tonic might also have been the difficulty that lay in his way. His difficulty might also have been his inability to reach the high notes when he started from a higher pitched string as the tonic note. The compass of Tirugnānasambandar's voice was more than 2 octaves as evidenced by his compositions. Added to this was the fact that the pitch of the young composer must have been round G, which was far higher than the pitch of an average adult's voice. The Yāzh was tuned to accompany the vocal music of an adult voice. The reproduction of *gamaka* effects on the high pitched short length strings must have also caused some difficulty to Tirunilakantha Yāzhpānar. It might incidentally be pointed out that Tirugnānasambandar ranks as the youngest composer in the world's musical history. He sang the hymn *Todudaiya seviyan* (தோடுடைய செவியன்) when barely three years of age.

There was the ghana and naya style in plucking technique. It was said that the tone produced by Vīṇa Sāmbayya of Mysore was equal to the tone of a hundred vīṇas. Another marvellous vainika of Mysore earned for himself the enviable distinction of *Savyasāchi* in vīṇa play by playing the vīṇa with perfect ease in both the possible postures i.e., using the right hand fingers for plucking the strings and the left hand fingers for gliding over the playing strings (as is usually the case), and also plucking the strings with the left hand fingers and gliding over the playing strings with the right hand fingers. Thus he was able to play the vīṇa in both * postures.

Gururāyāchāryulu of Vizianagaram was able to play the vīṇa in six degrees of speed. Shatkāla Govinda Mārār of Travancore provided the drone and the rhythmic accompaniment himself to his vocal music. He played the seven-stringed †tambura with his right hand and the kanjira with his left hand. The kanjira was held in position between the toe and the first finger of the right leg. Thus Govinda Mārār might be called an ‡*Ekallan*.

It is possible that this vainika got the idea of playing the vīṇa in the reverse posture from sculptures like those of the Vīṇadhara Dakṣināmurti in Pudukkottai. In the vīṇa played in the reverse posture the sarani, panchamam, mandaram and anumandaram strings must have occupied the positions of the 4th 3rd 2nd and 1st strings respectively of the normal vīṇa. The tala strings as well as their bridge and pegs must have been placed on the other side of the dandi. The change of the positions of the strings is not likely to affect the tonal response of the vīṇa.

† In this tambura, there were two panchamas, two saranis, two anusaranis and one mandaram, 7 strings in all.

‡ Ekallan was a person who was able to give a complete performance by himself without the aid of other accompaniments.

Some vainikas specialised in the *Chakrabandham* style of play. In this style of play the fingers of the left hand move over the svarasthānas of the finger board in an artistic and circling manner. The performer plays judiciously on the chanterelle string and the second string alternately and in the upper positions of the third string where necessary. A gita like *Minākshi Jaya Kāmākshi* in srīrāga was played in this manner.

An ingenious attempt has been made in recent times to produce the kampita gamaka in Jātātāṅgam. It may be pointed out in passing, that Jātātāṅgam is referred to as the *udaka vādyam* (literally, water instrument) in ancient literature. The art of playing on it is included among the chatushshashti kalas (64 arts). A wooden sphere of about two inches in diameter and provided with a handle is held in the left hand and the cup whose note is to be graced is first struck and immediately after, the wooden sphere is rapidly dipped into the water and lifted, the process being repeated the required number of times. The extent of the dip and the duration and speed of the action will depend upon the compass, duration and speed of the shake. The effect of the action is to alter artificially the water level, thereby producing the required increase and decrease of pitch and the desired kampita gamaka. A beautiful effect is also produced when the tip of the stick is made to strike the water meniscus lightly. This will result in tiny surface ripples.

CHAPTER IX

Raga and Emotion

The subject of "Rāga and Emotion" is a fascinating branch of study. No art stirs the emotions so deeply as music. Music is rightly styled the language of emotion. *Rasānubhava* through music is an experience and has a psychological basis. Treatises on music in Sanskrit and the vernaculars, written during the ancient, medieval and modern periods exist, but few of them have dealt with this subject at length. The subject of 'Rasa in music' has not received as much attention as Rasa in literature and drama. Music is a powerful vehicle for the portrayal of rasa or feeling. Rasa is a subject of universal significance.

The idea of rasa is one of the fundamental concepts of Indian aesthetics. The subject of rasa is treated by Bharata in his *Nāṭya sāstra*. Rasa in common parlance means juice, essence, satisfaction or taste. There are the shadrasas or six flavours (அறுசுவைகள்) —

- (a) Sweetness, இனிப்பு, தித்திப்பு
- (b) Bitterness, கைப்பு, கசப்பு
- (c) Sourness, புளிப்பு
- (d) Saltishness, உவாப்பு
- (e) Astringency, துவாப்பு
- (f) Pungency, காரம், கிராப்பு

Let us try to examine the scientific basis for the association of rasas with rāgas. There are certain truths in music which are universal in their character. That pairs of notes bearing the frequency ratios 1 : 2, or 2 : 3, or 3 : 4 (i.e., a note and its octave, a note and its panchama, and a note

and its *suddha madhyama* respectively) when sounded together give a pleasing effect is a well-known fact. Likewise, that the notes, *komal rishabha* and *komal gāndhāra* have a tinge of pathos about them is a well-known fact. These universal truths were known centuries ago. The subject of *samvāditva* or consonance has its roots in these fundamental truths. The ancient classification of *svaras* into *vādi*, *samvādi*, *anuvādi* and *vivādi* and the mention of intervals which were mutually *samvādi* or *vivādi* are worthy of note in this connection. 'Rāga and rasa' like 'chords and their effects' is a fascinating subject and is of interest from the point of view of psychology as well. The feelings recognised in Indian rhetoric and poetry are well known.

Rasa in literature is conveyed by words. Rasa in drama is conveyed by words and action. Rasa in an opera is conveyed by words, action and music. Rasa in a dance drama is conveyed by words, action, music and dance. In the drama, opera and dance drama, the eye in co-operation with the ear helps one to experience the intended feelings. There is a significance in Tiruvalluvar glorifying the sense of hearing (செவிச் செலவம்), since it is through this sense that we are able to experience the rasa of a piece of music and perceive the effect of a combination or succession of sounds.

There are the permanent aesthetic moods called *sthāyībhāvas*. The following table gives the *sthāyībhāvas* and the corresponding *rāsa* of aesthetic enjoyment —

Sthāyībhāva	Corresponding rāsa
Rati (love)	Śringāra
Hāsa (laughter)	Hāsyā
Soka (pathos)	Karunā
Krodha (anger)	Raudra
Utsāha (enthusiasm)	Vīra
Bhayam (fear)	Bhayānaka
Jugupsa (disgust)	Bībhatsa
Vismaya (wonder, surprise)	Adbhuta

The emotional effect of a *rāga* is dependent upon the frequencies of the notes that enter into its formation, as also on its *jīva svaras* and *nyāsa svaras*. A *rāga* whose *svaras* happen to be all *jīva svaras*, (ex. *Todi* and *Mohana*) admits of multiple *rasas*. The *jīva svara* is the index to the *rāsa* of a *rāga*. The *rāsa* of a *rāga* changes with the shift in emphasis on notes. For example, *Mukhārī* is a *rāga* with a tinge of pathos. But a feeling suggestive of *raudra rāsa* is brought about by the quick tempo, forcible delivery and the tessitura of the piece centring round the *tāra śaḍja* in the piece, *Chidambara darśanamā* in *Nandanār charitram*. Likewise in the *kṛitī Gṛipainela*

(sahāna), Tyāgarāja manages to present a feeling of joy coupled with devotion by abstaining from emphasising and elongating the madhyasthāyī śishabha

Since the inter-relation of the notes of a rāga determines its rasa, the drone is of great importance. The drone is the meter through which the frequency relationships of notes are established. The ancients with their simple scales and the harp type of instrument could not have perceived in full the rasa bhāva of a rāga. The drone instrument, Tambura, figures in the history of Indian music only at a later period. The term 'rāga' in the musical sense came to be used when it was found that a group of notes having specific frequencies roused a particular feeling. With the background of śruti, the emotional effect of a rāga was clearly perceived and this marks an important landmark in the history of Indian music.

That rāgas and tunes in them have certain specific rasas can be illustrated, from the fact that if a pathetic sāhitya is set and sung to a tune in a rāga, whose dominant rasa is vīra, it is the heroic aspect of the tune that will impress the listeners in spite of the pathetic idea underlying the sāhitya. The sāhitya will fall flat on the ears. Bilahari is an example of a gay and bright rāga and let us take a tune like the well known jatisvaram in this rāga. A mournful sāhitya may be set to this tune or to a march tune in Kedāra rāga and sung, but still on account of the bright and catchy quality of the tunes, the pathetic sāhitya will leave us untouched. Likewise in a pathetic rāga like Punnāgavarāli or Āhīri, a happy sāhitya may be set and sung, but nevertheless the plaintive quality of the tune will be haunting us. Again it is the soothing quality of the music of the lullabies that lulls children to sleep and not their words, for,

the children do not understand the words. Likewise it is the heroic character of the martial music that infuses enthusiasm and courage in soldiers.

The tempo or speed of a musical composition in applied music must be in consonance with its rasa. Pieces in *audra* rasa and *vira* rasa must be in *druta* laya or quick tempo. Pathetic pieces must be in *vilambita* laya or slow speed. Intricate time measures are out of place in applied music. Some *tālas* are named as suitable for particular rasas in ancient works.

The number of *rāgas* in vogue now is more than three times the number that was in vogue in medieval times and we are to day in a position not only to cite many *rāgas* as examples for a rasa, but also to give specific examples of *rāgas* for shades of a rasa. *Rāga* classification based on rasa is an interesting subject. With some exceptions, we may mention that generally, the colours, adhipatis, times and seasons mentioned for *rāgas* are a valuable commentary on the rasas of *rāgas* and help us to visualise the emotional contents of *rāgas* better. The traditional pictures of *rāgas* and *rāginis* are also a helpful commentary on their rasa bhāva.

In this connection, attention must be drawn to an important aspect of musical experience. There is such a thing as aesthetic enjoyment in music, which is independent and outside the scope of any recognised rasa. This is so particularly when we listen to art music, wherein we derive genuine pleasure without at the same time receiving any suggestion of a particular feeling. On such occasions we feel as if we are lifted to sublime heights. When we listen

to ālāpanas rendered in a superb and artistic style, in vocal or instrumental music, tears of joy flow down our face involuntarily. This ecstasy is *sangitānanda* and in such cases it is meaningless to search for *rasas*. It is the brilliant music that produces this effect. In compositions belonging to the sphere of art music, the composer is primarily concerned with the portrayal of the *rāga bhāva* in all its rich and colourful aspects and not with its *rasa* aspect. The words, if any, in such cases, instead of giving a clue to the *rasa* serve only as a vehicle to help the vocalist to sing the music. Thus it is futile to search for *rasas* in pure art forms. *Sanchāris* of *rāgas*, *varnas* and other such technical compositions have no *rasa* about them. But when a composer writes songs belonging to the sphere of applied music, the position is different. The *sāhitya* herein is an important factor and emphasises a definite idea. The music which clothes the *sāhitya* is a powerful contributory factor, in determining its *rasa* and is in consonance with the spirit of the idea expressed. The tune is composed with a *rasa conscience*. In *kālakshepams* or religious discourses and operas we laugh or lament along with the *Bhāgavata* or the characters according to the situation. But in a concert of art music we derive genuine aesthetic pleasure. *Kritis* like *Koluvaiyunnāde* in *Bhānavi* are instances of pure art forms, while compositions like '*Tera tiyyaga radā*' in *Gaulipantu* and '*Dev brova samayamide*' in *Chintāmani* which were occasioned by certain circumstances are instances of pieces depicting specific feelings. *Kritis* result in aesthetic pleasure. The effect is the same whether they are heard through the medium of vocal music or instrumental music.

Kṛtanas, being devotional compositions, inspire in us bhakti, only when sung, and not when performed on an instrument

The classical list of eight rasas is furnished by the following sloka

శృంగార వీర కరుణాద్భుత హాస్య భయానకాః ।

వీభత్సశ్చ తథా రాద్రో నాప్యేత్యష్ట రసాస్మృతాః ॥

Srngāra, Vira, Karunā, Adbhuta, Hāsya, Bhayānaka, Bibhatsa, Raudra

Sānti (శమ), being the absence of a feeling and implying a state of tranquility, rest or peace was not included in this list. But nevertheless it is an important rasa and with the inclusion of sānti rasa, the concept of *navarasa* came into existence —

శృంగార వీర కరుణా రాద్రో హాస్య భయానకాః ।

వీభత్సాద్భుత శాంతశ్చ నవనాప్యే రసాస్మృతాః ॥

Nirveda is said to be the sthāyī bhāva for Santa rasa

The *Divākaram*, a Tamil lexicon of the 10th cent, gives the nava rasas (ஒன்பது வகைப்பட்ட நூற்றைவகை) The names given for the nine sentiments or emotions are the same excepting that for bibhatsa, the name குறசை is found அருவருப்பு and இனிவரல are other names for this feeling of abhorrence, loathsomeness or disgust

The *ninth class* has been further expanded by the addition of *bhakti* or devotion. There are more compositions on *srngāra* and *bhakti* because they happen to be the supreme emotions of the soul. In the everyday life of human beings, *srngāra* and *bhakti* are the feelings they experience frequently. These ten *rasas* are not exhaustive; there are also other *rasas* like *vātsalya* (affection towards offspring), *preyas* (friendship) and *patriotism*. Tyāgarāja's compositions afford splendid examples for most of the *rasas*.

Srngāra rasa is known as *rasa rāja*. It is in a sense an epitome of all the *rasas*.

With the exception of *sānta rasa*, all the other *rasas* come within the fold of *srngāra*. Hence the theme of *srngāra* has been the favourite of composers. The *nāyaka* performing a heroic act can result in *vira rasa*. The separation of the *nāyaka* can result in *karunā rasa*. The *nāyaka* failing to turn up at the promised hour may provoke in the *nāyaki*, *raudra rasa*. The continued neglect and the disappointing attitude of the *nāyaka* may provoke in the *nāyaki*, a feeling of disgust. The occurrence of an unforeseen pleasant event may kindle *adbhuta rasa* in the *nāyaka* or *nāyaki*. In the diversity and complexity of situations that may arise in *srngāra*, every feeling can find a place.

In the elephantine movement, characteristic of the *padas*, we find moods like, anger, expectancy, aggressiveness, self-abrasion and crossed-in-love depicted.

The *vira rasa* admits of four sub-divisions: *dāna vira*, *dayā vira*, *dharma vira* and *yuddha vira*. This classification is based on the exemplary character of a person's

qualities of heroism in (1) liberality or munificence (ಒಕ್ಕಾಣ), (2) compassion, (3) righteousness and (4) heroism on the battle field.

Bhakti rasa has been glorified as the *ujjala rasa* (supreme emotion)

Rasas are mentioned for some rāgas in ancient works, but with the meagre descriptions of those rāgas it is not possible to form any idea of their correct melodic pictures or **rasas**

The *Rasa Ratnākara* of Sālvā, a Kannada work of the 15th cent mentions on p 8 of the first prakaranam, the colours and adbhūtais for rasas

A musical composition which aims at portraying a rasa should satisfy the following requirements —

- 1 The music should be in a wellknown rakti rāga and with a pronounced rasa bhāva
- 2 The music should flow in a natural manner
3. The song should not be too short
- 4 It should not be in an unusual tāla
- 5 Rhythmical complexities should be absent in it
- 6 Factors like assertive gamakas, dātu prayogas and vichitra kalpanas, tending to make the composition more intellectual in character, should be absent
- 7 Too many sangatis should not find a place

8. The musical construction of the piece should be neither too technical nor laborious and artificial
9. Technical and literary beauties should be confined to a bare minimum
10. Vowel extensions in the sâhitya should be few; that is vowels like akāra, ikāra and ukāra should be used sparingly and not profusely as in tāna varnas

If these requirements are not satisfied, the result will tend to detract from the intended rasa bhāva. Whereas any rāga with a melodic individuality can be used in art music, the same rāga will not necessarily be of use in applied music. Highly rhetorical sâhityas clothed in attractive tunes or in well-thought out and polished tunes will produce only aesthetic joy and not any one of the nava rasas.

The opening musical phrase of a song determines, to some extent, its rasa. Songs relating to joy and heroism generally speaking, commence on the tāra shadjā or on notes near that shadjā. The tessitura of the song also in such cases centres round the tāra shadjā. Lower tessitura implies sadness, diffidence etc.

Factors like pitch, intensity, timbre, massiveness, form, grace, language, rhythm are also contributory factors in establishing the rasa. The possibilities of portraying intensified effects through orchestral music are very many.

Themes and the ragas appropriate to depict them

Theme of the sāhitya	Rāga	Examples
Sringāra <i>vipralam- bha</i> i.e. sorrow due to separation	Mukhāri	<i>Vadasiyadī</i> (19th ashtapadī)
Sringāra sambhoga (joy in union)	Pharaz	<i>Smara sundarāṅguni</i> (Jāvalī)
Vira (heroic)	Bilahari	<i>Mannūl arasar pola</i> (Rāma nāṭakam) This is a spirited dialogue between Rāma and Paṇsurāma after the former's victorious return from Mithila after bending Siva's bow
Karunā	Āhari	<i>Viksheham kathā</i> (Krishna līlā Tarangini) The lament of Rukmini when she comes to know that her chances of marrying Krishna become remote This is grief bordering on despair
	Gaulipantu	<i>Tera tuyyaga rādā</i>

Raudra	..	Ārabhi	..	<i>Yāhi Mādhava</i> (17th Ashtapadi)
Hāsyā		Kāmbhoji		Konangi (divine clown) song figuring at the commencement of dance dramas
Bhayānaka	.	Ghanta	..	<i>Unnatāvuna</i> (Nowkā charitram)
Bibhatsa	.	Varāli		<i>Indukemi</i> (Nowkā Charitram) Disgust arising out of a feeling of helplessness and outraged self-respect
Adbhuta		Hindusthān behāg		<i>Idudāno tillai sthalam</i> (Nandanār charitram) The joyous surprise of Nandanār when he reaches Chidambaram, the object of his life's dream
Sānta (quietude)		Sāma		<i>Sāntamu leka</i> (Tyāgarāja)
Bhakti	.	{ Kedāragaula Bhairavi	--	<i>Vāriyanayana</i> (Prahāda bhakti vijayam)
Joy		{ Bilahari Mohana		<i>Sriraghuvara</i> (Tyāgarāja) <i>Kanugontini</i> Do <i>Nanu pālumpa</i> Do
Vātsalya	.	Nilāmbari		Cradle song <i>Lālā sri Krishnayya</i>

Themes and the ragas appropriate to depict them

Theme of the sāhitya	Rāga	Examples
Taunting (satirical) ...	Sāveri ...	<i>Telisenura</i> (paḍam) } <i>Chālu chālu</i> (Nowkā charitram)
Martial or yuddha vira	Nāta and Kedāram .	
Repentance or penitence	{ Yadukulakāmbhoji... Asāveri	<i>Ezha pārppān</i> (Nandanār charitram) <i>Saranam saranam Raghurāma</i> (Rāma nātakam)
Pride	Devagāndhāri	<i>Evaru manaku</i> (Nowkā charitram) (Conceit or māda sṣṣ resulting from saun darya garvam This song is sung in a challenging mood as the gopis are proud of their personal beauty, charm and attraction)
Vanity	Surati ...	<i>Srngārincukoni</i> (Nowkā charitram)

Entreaty (pleading)	{ Ritigaula	..	<i>Nannu vidichi</i> (Pahlāda bhakti vijayam)
	{ Purvakalyāni		<i>Satre vilagi</i> (Nandanāi charitram)
Resolution following an intriguing situation	Mohana		<i>Pedaṇṭṭakhyamani</i> (Nowkā charitram)
Loneliness, detachment from world, forest life, in mid stream	Vasanta		<i>Overture to Nowkā charitram</i>
Jealousy	Kalyāni	..	<i>Enkāṇum vara vara</i> (Tamil padam)

Khamās can portray bhakti and sringāra Rāgas with more than one jīva svara like Sankarābharana are capable of producing more than one rasa. Even in such cases, the musical analysis of the piece will reveal the line of development of the dhatu adopted to depict the particular rasa.

There are rāgas for portraying the different degrees of intensity of a particular rasa. For example if we take a feeling like grief, we can conceive of superficial grief, ordinary grief, bearable grief, unbearable grief and very deep, overwhelming and heart-rending grief. Rāgas like Mukhāri, Nādanāmākriya, Punnāgavarālī, Ghanta, and Ahiri can respectively portray these different degrees of grief. Likewise, rāgas like Ārabhi and Athāna can be used to portray the feelings of (1) anger provoked by a trifling situation and (2) anger provoked by a serious situation.

There are rāgas like Āhiri which can portray only a single rasa and rāgas like Todī, Kāmbhojī, Mohana, Sankarābharana and Kalyāṇī which can portray more than one rasa. A single note by itself has no rasa, since its value as suddha rishabha, sādharana gāndhārī etc., is dependent upon the frequency of the ādhāra shadja. For the proper enjoyment of the rasa of a rāga or a song in that rāga, the atmosphere of the place should be saturated with the sruti notes of the tambura or other drone. When we talk of drāksha rasa, nālikera rasa and kadali rasa in connection with the styles of Tyāgarāja, Muthuswāmī Dikshitar and Syāma Sāstrī, it denotes the style of musical writing characteristic of the three composers. It borders on intellectual appreciation.

As a rule, slow tempo is admirably suited for portraying karuṇā and bhakti rasas and fast tempo for portraying raudra

and vīra rasas. Simpler time measures like ādi, rūpaka, and chāpu (misra and khanda) will be useful for portraying rasas. However, much will depend upon the treatment of the rāga and the manner of development of the dhātu.

It may be of interest to note in this connection that particular metres (chhandas) are suggested for some rasas in literature.

Nindāstuti kīrtanas are of interest from the point of view of their rasa bhāva. A piece like, *Ilalo Pranatārti-harudanuchu* (Athāna) suggests anger provoked by disgust at the indifference of the Lord towards the composer. The piece, *Adigi sukhamulevva* (Madhyamāvati) has an undercurrent of sarcasm about it.

All rāgas evoke in us aesthetic enjoyment. It does not, however, follow that all rāgas should evoke in us some particular sentiment. A rāga like Kathana kutūhalam or a kriti like *Koluvaiyunnāde* (Bhairavi) gives rise to aesthetic pleasure and not to any one of the nine rasas. Thus there is such a thing as *gāna rasa* which we feel when we listen to art music and instrumental music (tāna on the vina or a string quartet of Beethoven for example). This *gāna rasa* is universal in its character. Applied music in conjunction with the ideas contained in the sāhitya can easily evoke any of the rasas recognised in poesy.

Some rāgas are useful for sāhityas relating to vainana or description —

Pantuvaiālī, (*Chudare chelulāra* - 2nd song in Nowkā charitiam),

Kedāragaula (*Venugānalolun*) and

Suratī (*Kānavenum laksham kangal*) - Rāmanātakam

may be mentioned as examples. Rāgas like Bhūpāla and Malayamārutam have a soft and soothing effect when heard before sunrise. On such occasions we get a feeling as if some welcome person rouses us from sleep. Vigour and gaiety are characteristic of Bilahari and hence it is appropriate to sing this rāga in the morning.

Darus (story songs) from their very nature are compositions suggestive of particular rasas. Six kinds of *darus* figure in *geya nātakas* and *nitya nātakas* —

(1) *Samvāda daru*

In *samvāda darus* or musical dialogues, the same music can appropriately figure for the question and answer as in songs 4 and 5 of *Nowkā charitram*. In song 4, the Gopis level charges against Kṛishna and in song 5 Kṛishna repudiates them. Occasionally the tune of the reply may be different, provided the tune of the questioner naturally suggests the reply or leads on to it as in the song, *Manninil arasar pola* (Rāma nātakam).

(2) *Uttara - Pratyuttara daru* - musical dialogue

Whereas in the *samvāda daru*, there is the presumption of arriving at the truth by a process of discussion and ratiocination, in the *uttara pratyuttara daru*, there are only statements made alternately by the two persons. There is no goal or conclusion to be reached in the latter case.

(3) *Pātra praveśa daru*, the entrance song of a character in a dance drama. This song, besides having a beautiful dhātu provides opportunities for the actor to display his talents in dancing.

(4) *Kolātta daru*, songs used in Kolāttam or stick play.

(5) *Svagata daru*

In *svagata darus* or musical soliloquies, the *rāgas* and tunes used must be of a reflective character. *Ennaga manasuku rāni* (Nilāmbaṇi) of Pīṭhāḍa bhakti vijayam is an excellent example

(6) *Varnana daru* - descriptive song

Whereas the *navarasas* and the feeling of *bhakti* can be experienced by a study of literature, the emotion of *gāna rasa* can be felt only through the medium of music. Instrumental music generally speaking, produces *gāna rasa* in the listener. Orchestral music can be used to create the *navarasas*. Musical compositions of the pure and applied class are in a sense even superior to poetry because through them one can experience all the *rasas* inclusive of the *gāna rasa*.

We go to a concert of art music to experience *gāna rasa*. Even when a *kṛiti* like *Kanakasaila vīhārini* (Punnāga-varāḷi rāga) is sung in a concert, we derive only aesthetic pleasure and not the feeling of pathos. In a *kālakshepam*, opera or dance drama, every song evokes in us a specific *rasa*. In fact when the Bhāgavatai in a *kālakshepam* digresses needlessly or sings *kalpana svaras* for a song in the middle, the particular *rasa* atmosphere developed by him so far gets weakened and he has to strain once again to restore the atmosphere of the original *rasa*. We go to a *bhajana* to experience *bhakti rasa*.

As for the question why *gāna rasa* (இசைச் சுவை) as such has not been mentioned in early works, the answer may be

given that for many centuries, music has always been thought of in its applied aspects and as a vehicle for singing the glories of God. With the development of manodharma sangita and instrumental music, the way was paved for the emergence of the concept of gāna rasa.

In the case of rāgas of multiple rasas, it is possible to say whether the admissible rasas are all equally dominant or whether one of the rasas is dominant and the rest secondary. Thus in a rāga like Devagāndhārī, the *pradhāna* rasa or primary feeling is *vīra*. Bhakti may be mentioned as an *uparasa* for this rāga. The compositions, *Kṣīrasāgara sayana* and *Karunāsamudra* stand as examples for these two aspects of the rasa bhāva of this rāga.

The primary object of a kirtana is to create the feeling of bhakti or devotion. Kritis may create any one of the navarasas or the feeling of gāna rasa. Thus kritis like *Koluvayunnāde* (Bhairavi) and *Nāṇvādhāra* (Bilahari) evoke only gāna rasa whether sung or performed on an instrument. Kritis like, *Teratuyyaga rādā* (Gaulipantu) and *Devibrova samayamude* (Chintāmani) create the feeling of pathos. The kriti, *Sāntamu leka* (Sāma) evokes sānta rasa. The kriti, *Enta bhāgyamo* (Sāranga) evokes adbhuta rasa. Hence the significance of Tyāgarāja's statement '*navarasayuta kritiche bhāgyinche*' in the kriti, *Sogasugā mridanga tālamu* in Srīranjani rāga. Thus Kritis may be classified into —

- 1.) Those which evoke only gāna rasa and
- 2.) Those which evoke any of the nine rasas

In a dance concert, the abhinaya performed for a pada, jāvali, ashtapadi or other similar item will evoke in us one of the navarasas or bhakti rasa. But an item of pure nr̥tta like the dance performed for a jatisvaram or tillāna, will evoke a feeling corresponding to gāna rasa.

There is a significant purpose in singing the Madhyamāvatī rāga at the close of a concert. This rāga takes the notes which are met with earliest in the cycles of fifths and fourths. These notes are highly concordant notes. When a rāga taking these notes is sung, a feeling of normality and aesthetic satisfaction will be felt.

The singing of the Madhyamāvatī rāga towards the close of a concert is preceded by the Mangalam. Mangalam is an auspicious song and every concert is concluded with a mangalam. Such songs are composed only in auspicious rāgas. Some of the wellknown mangalams are given below —

Name of the song	Rāga	Composer
Ni nāma rūpamulaku	Saurāshtra	Tyāgarāja
Mākulamunakiha	Suratī	„
Jayamangalam	Ghanta	„
Jayamangalam	Mohana	„
Jānaki nāyaka niku	Dhanyāsi	„
Jayamangala	„	Purandara Dāsa
Bhujaga sāyino	Yadukulakāmbhojī	Svātī Tīrūnāl
Srī Rāmachandranukku	Suratī	Arunāchala Kavīnāyar
Mangalam Srī Rāmunaku	Vasanta	Mysore Sadāsiva Rao
Srīmat Kākarla vamsābdi	Madhyamāvatī	Walaajpet Venkata- ramana Bhāgavatar

In the *Sangita Makaranda* of Nārada, in the *Sangitā-dhyāya*, pāda 1, verses 47-48 we find rasas mentioned for the *sapta svaras* —

షడ్జస్యాద్భుత పీఠాచ విమధస్య చ రాద్రకః
 గాంధారస్య చ శాంతంచ హాస్యాఖ్యం మధ్యమస్యచ
 పంచమస్యచ శృంగారో బీభత్సో ధైవతస్యచ
 కరుణాచ నిషాదస్య సప్తస్థాన రసానవ ॥

In Bharata's *Nāṭya Sāstra* Chapter VI, appropriate colours are mentioned for the rasas

If a piece belonging to the sphere of applied music is harmonised, then as part of the harmony, the notes eschewed in the rāga either in the ārohana or avarohana or both and phrases which do not emphasise the melodic individuality of the rāga will certainly come in and these will tend to neutralise the intended emotional effect of the rāga. For the same reason, modulation into other keys during the course of a composition or producing the idea of another rāga by the shift of the tonic note is detrimental to its rasa bhāva, since the inter-relation of the frequencies of the notes is affected on account of the change in the fundamental. Hence the importance of the attendant drone accompaniment in a concert of Indian music

CHAPTER X

Mudras in Musical Compositions

Mudras are names introduced in the s̄ahityas of musical compositions to signify certain facts. They serve to reveal facts like the authorship of the composition, its rāga, tāla, type, nāyaka, etc. The mudra is so cleverly introduced as to maintain a continuity of sense in the s̄ahitya. The beauty underlying the weaving of the mudra into the texture of the s̄ahitya can be felt only when the composition is sung. Valuable internal evidence is furnished by some mudras. Barring some exceptions, it is not obligatory on the part of a composer to introduce any or all the admissible mudras in a musical composition.

The term *mudra* in common parlance means a seal, stamp, print, mark or badge. In dancing it means the representation of an idea through a hand pose. When only one hand is used it is called an *asamyuta hasta* and when both the hands are used it is called a *samyuta hasta*. In religious worship also we have the mudras or hand poses - the *anga nyāsas* and *kara nyāsas*. In Tantric worship many mudras are used.

In musical compositions, the word *mudra* refers to the impress or mark proclaiming a certain fact that it is the composition of a particular composer, that it is in a particular rāga and so on. The colophons figuring at the conclusion of sargas in epic poems and kāvyas furnish the earliest examples of mudras relating to authorship. Such colophons also furnish the titles of the adhyāyas and sargas. For

example in the *Bhagavadgita*, we find at the end of the 6th chapter —

ఇతి శ్రీమద్భగవద్గీతా సూపనిషత్సు
ధ్యాన యోగో నామ షష్ఠోధ్యాయః ॥

(i e, in the Upanishad of the *Bhagavadgita*, this is the sixth chapter entitled the Yoga of Meditation)

Likewise in the *Gita Govinda* of Jayadeva and the *Krishna lila Tarangini* of Nārāyana Tīrtha we come across statements like the following —

ఇతిశ్రీ శీతగోవిందే శృంగార మహా కావ్యే శ్రీకృష్ణదాస
జయదేవ కృతౌ రాధావర్ణనే ముగ్ధమాధవోనామ దశమస్కర్ధః ॥
ఇతిశ్రీ శివరామానంద తీర్థ పాదసేవక శ్రీనారాయణ తీర్థ
విరచితాయాం శ్రీకృష్ణలీలా తరంగిణ్యాం శ్రీకృష్ణగోపీ
వస్త్రాప్రహర గోవర్ధనోద్ధార వర్ణనం నామ పంచమ తరంగః ॥

This latter colophon incidentally indicates that Nārāyana Tīrtha was a disciple of Sivarāmānanda Tīrtha

In a collective work like a geyanātakam (opera) or a nritya nātakam (dance drama) some composers like Tyāga-
1āja have introduced their ankītam in the darus and others like Gopālākṛishna Bhāratī have not done so Gopālākṛishna Bhāratī's signature occurs only in his vidutī kīrtanas (individual songs) and not in the songs pertaining to the story of Nandanār Charitram

Classification

Mudras may be classified into —

(1) *Vāggeyakāra mudra* i.e., the ankitam or the signature of the composer. This admits of two divisions —

(a) *Svanāma mudra*, wherein the composer has signed the compositions with his own name, as in the instances of Tirujñānasambandar, Jayadeva, Nārāyaṇa Tirtha and Tyāgarāja.

(b) *Itaranāma mudra*, wherein the composer has resorted to some other name for the purpose. This other name may be the name of some Deity, or a name suggestive of the fact that the composer was a devotee of a particular Deity. Patnam Subrahmanya Iyer and Subbarāya Sāstri resorted to the ankitams, Venkatesa and Kumāra respectively. Muthuswāmy Dikshitar and Ānayya adopted the signatures, Guruguha and Umādāsa respectively.

(2) *Rāga mudra* is a case where the name of the rāga of the piece is introduced in the sāhitya of a song. The presence of the rāgamudra may be casual as in the kriti: *Mohana Rāmā* (Mohana - Ādi) of Tyāgarāja or may be purposive as in the sāhityas of rāgamālikās. The presence of the rāga mudra is a necessary feature of the lakshana gītas, rāgamālikās and rāga tālamālikās. The rāgamudra is seen in many of the compositions of Muthuswāmy Dikshitar.

The 72 Mela rāga kritis of Kōtīśvara Ayya (1869-1938) also contain the rāga mudra.

A rāga name might occur casually in the sāhitya of a kriti but it will not be a rāgamudra unless that name happens to coincide with the rāga of the piece itself. Thus in the kriti "*Saṅkari saṅkuru*" of Syāma Sāstri in Saveri rāga, the name, Kalyāṇi occurs in the anupallavi but it is not a rāgamudra since Sāveri is the rāga of the piece. Likewise in the kriti, *Himādrī sute pāhimām*, the name Kīravāṇi occurs, but it is not a rāga mudra since Kalyāṇi is the rāga of the piece. Thus *rāga nāma* and *rāga mudra* are two different things.

In compositions containing the rāga mudra, the rāga name may occur independently as the name Janarājanī in the kriti, *Pāhimām Srī Rāja Rājēsvari* of Mahā Vaidyanātha Iyer or in conjunction with the syllables preceding or following it, as the name Ārabhi (*samsārābhutyaṇṇa*) in *Srī Sarasvatī namostute* of Muthuswāmy Dikshitar.

The rāga mudra may occur in the pallavi, as in *Kuṅja dalāyatākshī* (Eṇṇālām. rōṇāṇi rāga) or anupallavi as in *Ambā Nilāyatākshī* (Nīlāmbāṇi rāga) or charana as in *Nīlākantam bhajeham* (Kedāṅgaṇṇa rāga). A rāga mudra besides serving to confirm the rāga of the song or the rāga of the concerned section of a rāgamālīkā, may have an etymological value also. The Telugu sāhitya, *Pannagādīśa*, for the rāgamālīkā *Pannagendra sayana* of *Sātri Tirunāl* helps us to conclude that the rāga of the seventh section of the rāgamālīkā is Āhīṇi and not Nādanāmaṇīya. The statement "*Sāmagānavinutam*" in the *Chaturdasa rāga-mālīkā* of Muthuswāmy Dikshitar leads to the conclusion that Sāma is the correct name of the rāga and not Syāma.

The *rāga mudra* is also seen in the following compositions —

Name of the song	Rāga	Composer
<i>Kāmākshi</i> (svarajati)	Bhairavi	Syāma Sāstrī
<i>Arukkuttān</i>	Devamanohari	Gopālakrishna Bhārati
<i>Padari varuqudu</i>	Kāmbhōji	Ghanam Krishnayyar,

The Pallavi,

Sankarābharana veni ninnu

Chāla namminadirā sugunavattiyagu ||

in Sankarābharana rāga, Aditāla, furnishes an example of a Rāga mudra pallavi

3 *Tāla mudra* signifies the introduction of the name of the tāla in the sāhitya. The presence of the tāla mudra, is a necessary feature of the composition known as tālamālikā. In the sāhityas of rāgatālamālikās, the rāga mudra and tāla mudra have to be present in each section of the composition.

4 *Achārya mudra*, wherein the composer indicates the name of his preceptor or guru. In the sapta tāla gita in Nāta rāga, *Gāna vidyā dhurandhara Venkatasubbārvaguro*, we find the composer, Paidāla Gurumurti Sāstrī referring to his Guru. In the Kṛiti, *Māyātita svarūpini* (Māyāmālaya, gaula raga) we find the composer referring to his guru, Muthuswāmy Dikshitar.

5 *Rāja mudra*, wherein the composer directly or casually, reveals the name of his patron. In the anupallavi of the Tamil padam, *Pānengum pārttālum* (Kalyāṇi rāga), Ghanam Krishnayyar, the composer refers to his patron, Kachchi Kalyāṇa Ranga of Udayārpālayam. In the *Chaturdasa*

Rāgamālikā of Muthuswāmy Dikshitar, we find the composer referring to his patron Vaidyalinga Mudaliyār, the learned Mirasdar of Kulikkaraī. In the Vaina, *Kanakāṅgi*, in Tōḍi raga, Ata tāla, the composer refers of his patron Sarabhoji Mahārājah. In the song *Adalusedanārāda* (அதலசேடனாராட) Arunagirināthar casually refers to his patron, Prauda Pratāpa Deva Rāya II (1422—1449), Emperor of Viṣayanagar.

6 *Vamsa mudra*, wherein the composition contains references to the pedigree, vamsa and gotra and the names of the parents of the composer or of a composer in whose honour the composition is composed. In the *Mangalāshtakam* composed in praise of Tyāgarāja, by his disciple Walajapet Venkatarāmāna Bhāgavater, the sage of Tiruvaiyār is mentioned as belonging to the *Kākerla vamsa*. In the kriti, *Dorugunā ituvāṇṭi seva*, Tyāgarāja mentions that he is the son of Rāmabrahma. In the kriti, *Sitamma māyamma*, he casually alludes to the names of his parents in the pallavi.

7 *Prabandha mudra* is a case wherein the name of the particular prabandha is introduced in the sāhitya of the composition. The occurrence of the prabandha mudra is a feature of many medieval compositions of the technical group. Some tillānas (Ex. the tillānā of Pallavi Seshayyar in Dhanyāsī raga) contain the name 'tillānā' in their sāhitya. The following compositions also contain the prabandha mudra —

Type of Prabandha	Song wherein the mudra occurs	Composer
Tiruppugazh	{ <i>Sinattavar</i> , <i>Bhaktiyāl yānunar</i> }	Arunagiri- nāthar
Padam	<i>Nettandi</i>	{ Subbarāma Iyer of Vaidhisvaran Kovil }

Satarāga ratna mālīka $\left\{ \begin{array}{l} Rāgaratnamālī \\ kache - Ritiṅgaṭṭa \\ rāga, Elāvatāra- \\ Mukhāri raga \end{array} \right\}$ Tyāgarāja

The fact of the *Satarāgaratnamālīkā* having been composed by Tyāgarāja is revealed by these two compositions

8 *Nāyaka mudra* is a feature of padas Padakāras have each chosen a nāyaka of their choice e g, Muvva-gopāla by Kshetrajna, Rājagopāla by Muvvalur Sabhāpati Iyer, Venugopāla by Sārangapāni, Manāruranga by Ghanam Sinayya, Muttukkumāra by Vaidisvarankovil Subbarāma Iyer and so on

9 *Sthala mudra* or *Kshetra mudra* is a case wherein the name of the shrine in praise of which the song is composed, is introduced in the sāhitya This mudra can be seen in the Tevāram, Tiruvāchagam and Tiruppugazh Tyāgarāja in many cases has composed five songs (Pancharatnam) in praise of the Deities of the shrines which he visited Therein we find in the sāhityaś, the name of the Deity (Devata mudra) or the sthala (sthala mudra) or both incorporated (Ex *Kovur Pancharatna* and *Tiruvottiyur Pancharatna*) In the *Panchalinga sthala kriti*s of Muthuswāmy Dikshitar, the *Navarotna mālīkā* of Syāma Sāstī and the *Kālahastisa Pancharatna* of Vīna Kuppayyer also we see this mudra Generally speaking, we find the sthala mudra in the sāhityas of songs pertaining to shrines These mudras establish beyond doubt that these songs were composed in praise of the particular shrines The kriti, *Sri Pārthasārathe* in Bhairavī rāga - Khanda jāti Triputa tāla by Mysore Sadāsiva Rao contains the following in the svaya sāhitya part

Kairavamam tata nvesa Sri Tiruvallikkeni Nagarisa.

10 *Biruda mudra* is a case wherein the composer refers to the *biruda* or the title enjoyed by him or associated with the composer or *lakshana-kāra* in whose praise the song is composed

11 *Lakṣhaṇa-grantha mudra* is a case wherein the composer refers to a significant *lakṣhaṇa-grantha* digested by him. The finest example is the *kṛti*, *Svararāgāśudhārasa*, wherein, in the *mudra-charana* the composer refers to himself as having digested the work, *Svuvārṇava*

12 *Miscellaneous mudras* In the Tamil dance drama, "*Sarabendra Bhāpīlā Kuravanji nāṭakam*", in Scene III, in a song pertaining to the hero, we find the names of 19 years in the Hindu cycle of 60 years: *Prabhava*, *Prajāpatti*, *Māmatha*, *Paritāpi*, *Dundubhi*, *Virodhi*, *Dūṣṇatī*, *Kālayukti*, *Vijaya*, *Vikruti*, *Jaya*, *Ānanda*, *Pramāti*, *Isvara*, *Kuroti*, *Kilaka*, *Chitrabhānu*, *Sarvajittu* and *Akshaya* cleverly introduced and with a meaning. These years are possibly significant years in the life of Sarabhoji (1800-1832), the ruler of Tanjore. This might be termed *Samvatsara mudra*.

In some Telugu poems we find the names of the metres in which they are composed introduced. This might be termed *Chkandas mudra*.

Varieties of Vaggeyakara mudra

Of the dvādaśa mudras or twelve kinds of mudras figuring in musical compositions, the *vāggeyakāra mudra* presents an interesting field for detailed and analytical study.

The *vāggeyakāra mudra* usually occurs in the *charana* and occasionally in the *pallavi* or *anupallavi*. In songs with

'plural charanas, the signature of the composer will occur in the *ābhoga charana* or the last charana. In the *Tevāram*, the *Tnūkkadaikkāppu* (திருக்கடைக்காப்பு) of the last stanza of the hymn contains the signature of the composer.

The *ankitam* or the signature adopted by composers may be classified into —

1 Those which the composers chose voluntarily, as in the instances of Tyāgarāja, Jayadeva, Nārāyaṇa Tīrtha and by *svanāma mudrakāras* generally speaking.

Composers like Subbairāya Sāstri and Patnam Subramanya Ayyar furnish instances of *itaranāma mudrakāras*, who also chose mudras of their own accord.

2. Those which the composer was led to choose on account of a particular circumstance or incident in his life.

Muthusvāmy Dikshitar chose the *ankitam*, *Guruguha* because he was blessed by Lord Skanda, while at Tiruttani. His first composition, *Srināthādi* (*Māyāmālavagaula*) followed immediately afterwards. It is possible that his father, Rāmāsvāmy Dikshitar, the author of the monumental composition *108 Rāga tāla mālika*, a composition longer than the longest symphony of Beethoven, adopted the signature, *Venkatakrishna*, because he was patronised by Manali Venkatakrishna Mudaliar (alias Chinnayya Mudaliar).

3 The name of the family Deity has been adopted as the *ankitam* by a few composers. Vina Kuppayyar and his son Tiruvottiyur Tyāgayyar adopted the signature *Gopāla-dāsa*, because they were devotees of their family Deity, 'Sri Rādhā Rukminisamedha Sri Venugopālasvāmy'.

This viṅraha can be seen even now with the surviving members of the family. When the great composer Tyāgarāja visited Madras about the thirties of the last century, he went to the house of his disciple, Vīṇa Kuppaiyer and sang a song in praise of this Deity.

Some composers adopted as their signature, the names of their native villages (svagrāma) or the Deities of their native villages (svagrāma mūrti).

<i>Composer</i>	<i>Svagrāmamūrti</i>
Kshetrayya	Muvvagopāla
Karūr Dakṣināmūrti Sāstri and Karūr Devudayya	{ Garbhapurīsa, i.e. Lord of Garbhapurī, the present Karur or கரூர் in Trichy Dt. The forms, Garbhapurivāsa and Garbhapurī sadana are also met with in their compositions
Dharmapurī Subbarāyar	Dharmapurīsa

Although Bhadrāchala Rāmadās was born in Nelakondapalli, he adopted the signature Bhadrāchala, because he became a devotee of Śrī Rāmā of the place, during his official career as the Tāhsildar of Bhadrāchalam.

Purandara Dāsa and Bhadrāchala Rāmadāsa were known by other names in their early lives. Sīnappa and Gopanna were respectively their names in their boyhood. They however adopted as their signatures the names by which they are now known to musical history.

There are instances of a svanāma mudra of one composer becoming an itānāma mudra in the hands of another composer. Vijayagopālaswāmī signed his compositions

(*Kṛipayāmāmuddhara Śrī Kṛishna*—*Madhyamāvatī* rāga for example) with his own name. This name was adopted by the later composer, Srinivāsaiyyar of Madurai (*Ninnū-minchinavārevaramma* - *Nātakulanji* rāga, for example) :

From the point of view of the variety of *Vāggeyakāra* mudras used, composers may be classified into —

1) *Ekamudrakāras* i.e. those who used a single mudra.

Tyāgarāja, *Muthuswāmy Dikshitar* and *Syāma Sāstri* used a single mudra. *Tyāgarāja*, *Gurugoka* and *Syāma Kṛishna* respectively

2) *Paryāya mudrakāras* i.e., these who used the synonyms also in addition

Svāti Tirunāl used *Padmanābha* and the synonyms of that name. —

<i>Abjanābha</i>	<i>Pankajanābha</i>
<i>Ambujanābha</i>	<i>Sārasanābha</i>
<i>Jalanābha</i>	<i>Sarasijanābha</i>
<i>Jalarukanābha</i>	<i>Sarasirukanābha</i>
<i>Kamalanābha</i>	<i>Sanojanābha</i>
<i>Kanjanābha</i>	<i>Vanaajanābha</i>
<i>Nalinanābha</i>	<i>Vārījanābha</i>

Svāti Tirunāl tops the rank of *Paryāya mudrakāras*. Of course the word *padma* (lotus) with its innumerable synonyms gave him an advantage. *Kanchi Venkatādriswāmy*

and Ghanam Krishnayyar are other paryāya mudrakāras. The former uses the mudras, *Vāranasaila*, *Kunjarādri*, *Dantigiri* and *Karigiri* and the latter, *Velava*, *Muttukumara*, and *Muruga*

Patnam Subrahmanya Ayyar in addition to using Venkatesa or Venkatesvara has resorted to the slightly expanded forms *Sri Venkatesa*, *Varada Venkatesvara*, *Adi Venkatesa* and *Sri Varada Venkatesa*

Gopālakrishna Bhārati has used the forms, *Gopālakrishna* and *Bālakrishna*

Sundaramurti, Nāyanār is an instance of a *svanāma mudrakāra* to use the full as well as the shortened forms of the mudra. Thus he uses the forms, *Nambayārūran* or *Arūran nambi* (Ex *Maruvār konrai*), *Arūran* (Ex *Tillai vāzhandanar*), and *Uran* (Ex *Marrupparrena*)

Appar reveals the identity of his authorship by a reference to Rāvana in some form in the last stanza of his hymns

3) *Bahumudrakāras* i e, those who used more than one mudra

Bhadrāchala Rāmadās is a rare instance of a *bahumudrakāra*. In some songs, he signed as *Rāmadāsa* (Ex *Kamalānāyana Vāsudeva*). In some other songs he uses the mudra *Bhadrāchalavāsā* and the synonyms, *Bhadrādri*, *Bhadrasaila* and *Bhadragiri* (Ex *Edanunnādo*). In songs like *Antā Rāmamayam*, we find him using both these two mudras. Thus he is the rare instance of a composer to use both the

svanāma and itara nāma mudras He also ranks as a paryāya mudrakāra

The vāggeyakāra mudra, generally speaking is used to indicate the author of the composition. But sometimes it is used in a dual sense i. e., in the sense of the composer and in the sense of the Deity of the same name as that of the mudra. The examples given in A and B on pp 140 and 141 will bear out these two points —

A. Mudras which indicate only the identity of the composer

	Name of the song and its rāga	Relevant words from the piece	Meaning
1	<i>Elāvatāra</i> (Mukhārī)	Sataiāgaratna mālikanu rachinehina Tyāgarājūnaku	“Is it for blessing Tyāgarāja who has written the <i>Satarāgaratna mālika</i> etc.
2	<i>Chakkani rāja</i> (Kharaharapriya)	Tyāgarājuntane bāganalakonna	Rama, who has taken residence in the house of Tyāgarāja
3	<i>Vidamu seyave</i> (Kharaharapriya)	Tyāgarāju prematonosange	The offerings given by Tyāgarāja with love
4	<i>Nidhichālā sukhāmā</i> (Kalyāni)	Tyāgarājanutuni kirtana sukhama?	Which is good? Tyāgarāja's kirtanas? etc.
5	<i>Vinave O manasa</i> (Vivardhani)	Tyāgarāju manavi	Listen to what Tyāgarāja says
6	<i>Talli ninnu nera</i> (Kalyāni)	Syāma Krishna Paripālīni	Protector of Syāma-krishna (i.e. Syāma Sastri)

7 *Venkatasaṇḍa* (Hamir kalyāṇi)

Kumārūṁ brova bāramā

Is it difficult for you to protect Kumāra (i.e. Subbarāya Sāstri, the composer)

8 *Kanaka sabhāpati* (Dhanyāsi)

Gopālakṛishṇan paṇiyum tillaḷ

The Tillai (Chidambaram) Natarāja, whom Gopāla kṛishṇa Bhārati worships

When a mudra has the suffix 'Dāsa' as Umādāsa, Guhadāsa etc., it can be used only in the sense of the particular composer

B Mudras which in addition to indicating the identity of the Composer also suggest another meaning

Name of the song and its rāga	Relevant words from the piece	Additional meaning
1 <i>Vinayamu nenu</i> (Saurāshtra)	Tyāgarājādī devatulu	God Siva
2 <i>Sankarī samkuru</i> (Sāveri)	Syāma Kṛishṇa Sodarī	Sister of Vishnu i.e. Pārvatī
3 <i>Jananī ninu vinnā</i> (Ritigaula)	Kumāra janani	Mother of Subrahmaṇya
4. <i>Natanamādīnār</i> (Vasanta)	Gopālakṛishṇan pāda	As God Viṣṇu sang

In addition to the *svanāma mudrakāras* already noticed, the following are the other composers who have signed their compositions with their own names —

Srī Chandiasekharendra Sarasvatī

(Author of *Sivāshtapadī*)

Rāmakavi (Author of *Rāmāshtapadī*)

Tukārām

Vittala Pant

Paidāla Gurumūti Sāstri

Mysore Sadāsiva Rao

Kundrakkudī Krishnayyar

Tarangambādī Panchanadayyar

Cheyyur Chengalvarāya Sāstri

Pallavi Seshayyar

Ramnād Srinivāsa Ayyangār

Kavikunjara Bhārati

Kāmakotī Sāstri

Arunāchala Sāstri

Chinnī Krishna Dāsa

Tachur Singarāchārṇu

Parānkusa Dāsa

Venkata Vittala Dāsa

Tumu Narasimha Dāsa

Rāmānuja Dāsa

Desika

Gurupūranānanda

Mambalam Ādī Nārāyana Dāsa

Venkata Varada Dāsa

Pāpavināsa Mudaliyār

Vaithiswaran Koil Subbrāmayyar

Vedanāyakam Pillai

Achuta Dāsar
Lingaraḥ Urs
Nīlakanta Sivan

A *svanāma* *mudra* or an *itānāma* *mudra* may occur as an address (vacative case), Ex 'Srinivasa' in the compositions of Ramnad Srinivāsayyaṅgār or 'Venkatesa' in the compositions of Patnam Subramanya Iyer. These *mudras* may also occur in one or other of the following forms (1) Praised by so and so, (2) Written by so and so, (3) Composed by so and so, etc

Examples

<i>Form</i>	<i>Song</i>	<i>Rāga</i>
Tyāgarājaṇuta	<i>Nanuganna talli</i>	Sindhukannada
Tyāgarāja vinuta	<i>Kalala nerchina</i>	Dipaka
Tyāgarāja sannuta	<i>Sujana j'vana</i>	Khamās
Tyāgarāja vandya	<i>Ninne nera</i>	Pantuvarāli
Tyāgarāja vandita	<i>Nāmoralanuvini</i>	Aṣabhi
Tyāgarājāpta	<i>Nenarunchinānu</i>	Mālavī
Tyāgarājārchita	<i>Merusamāna</i>	Māyāmālavagaula
Tyāgarāja hruddhāma	<i>Ninubāsi</i>	Balahamsa
Tyāgarāja hrudālaya	<i>Pāhi Rāmachandra</i>	Sankarābharana
Tyāgarāja hruchohāri	<i>Ambā ninnu</i>	Arabhi
Tyāgarājuni hrudaya sarojavāsini	<i>Vināyakuni</i>	Madhyamāvatī
Tyāgarāja kula vibhūsha	<i>Rāma ni samāna</i>	Kharaharapriya
Tyāgarāja vaiada	<i>Mohana Rāma</i>	Mohana
Tyāgarāja paripāla	<i>Mā Jānaki</i>	Kāmbhojī
Tyāgarāja pālam	<i>Nādatanumanisam</i>	Chittaranjanī

Tyāgarāja chitta		
hitudu	<i>Undedi</i>	Harikāmbhoji
Tyāgarāja pūjita	<i>Nenendu vetakutura</i>	Karnāṭaka byāg
Tyāgarāja sevītāya	{ <i>Namo namo</i> <i>Rāghavāya</i> }	Desya toḍi
Tyāgarāja rakshaka	<i>Rāmābhīnāma</i>	Darbar
Tyāgarāja hrudbhāntam	<i>Bhajare bhaja</i>	Kannada
Tyāgarāja hrutsadana	<i>Panipati sāyi</i>	Jhankārādnvani
Tyāgarāja hrudābjasu bhīnga	<i>E Pāpamu</i>	Athānā
Tyāgarāja hrudbhūshana	<i>O Ranga sāyi</i>	Kāmbhoji
Tyāgarāja mānasa saroja	<i>Rāma nīnne</i>	Husenī
Tyāgarāja poshakudu	<i>E Rāmuni</i>	Vakulābharanam
Tyāgarāja hrudayākāra	<i>Vandanamu</i>	Sahāna
Tyāgarāja hrudvārija mitia	<i>Challala nāto</i>	Vegavāhini
Tyāgarāja ketahāra	<i>Etlā dorikutivō</i>	Vasanta
Tyāgarāja kulapāvana	<i>Rāmā Raḡhukula</i>	Kāpi
Tyāgarāja svānta sadana	<i>Sarvānta yāmi</i>	Bhānavi
Tyāgarāja vara		
hrudaya nivesa	<i>Sambho Mahādeva</i>	Pantuvārālī
Tyāgarāja ripu jalada samira	<i>Māmava satatam</i>	Jaganmohini
Tyāgarāja geyamā	<i>Sri Rāma pādama</i>	Amritavāhini
Tyāgarājūni mitru	<i>Amma rāvamma</i>	Kalyānī
Tyāgarāja hrud sanchāram	<i>Sundara tara</i>	Pantuvārālī
Tyāgarāja manohari	<i>Darini telusu</i>	Suddha sāveri

Tyāgaiājesa	<i>Dāsarathe</i>	Kokilapriya
Tyāgaiāja jihvapāi iājillu	<i>Urahe galkunā</i>	Sahāna
Tgāgarāja sakhudu	<i>Sringārinchukoni</i>	Suratī
Sri Jayadeva banita	<i>4th Ashtapadi,</i>	Pantavarālī
Sri Rāmakavi vara kritamiti gitam }	<i>Rāmāshṭapadi</i>	Desākshi
Rāmadāsa vilāsa	<i>Ninnubonichchedanā</i>	Madhyamāvati
Syāmakrishna } paripālīni }	<i>Kanakasāra</i>	Punnāgavarālī
Syāmakrishna hrudayāmbuja- nilaya }	<i>Brovasamayamu</i>	Punnāgavarālī
Guruguhanuta	<i>Cheta Sri</i>	Dvijāvantī
Guruguhamahita	<i>Sri Rājagopāla</i>	Sāveri
Guruguharūpam	<i>Mānasaguru</i>	Anandabhairavi
Guruguha pūjitam	<i>Nilakantam</i>	Kedāragaula
Guruguha janani	<i>Dharmasamvardhani</i>	Madhyamāvati
Sādāsivakavi jivana	<i>Sri Lakshmiramana</i>	Bhairavi
Sādāsiva Kavi Poshana }	<i>Sri Pārthasārathe</i>	Bhairavi

Itaranama mudrakaras

The name adopted may be the name of a Deity as Venkatesa, Srinivāsa, Kumāra or Padmanābha or a name suggestive of the fact that the composer was a devotee of a particular Deity. Mudras like Guhadāsa, Gopāladāsa and Umādhāsa are examples of the latter type.

Whereas the svanāma mudra usually occurs in the chaitanya, the itaranāma mudra may occur either in the pallavi, anupallavi or chaitanya. In tāna varnas however, the mudra has to come in the anupallavi.

There are instances of itaranāma mudras being used by more than one composer

<i>Mudra</i>	<i>Composers who have used them</i>
Paramahansa	{ (1) Sadāsiva Brahmdendra (2) Madhusūdana Paramahansa
Gopaladāsa	{ (1) Vīna Kuppaiyyar and his son, (2) Tuvottiyur Tyāgaiyyar
Venkatesa	{ (1) Mānambuchāvadī Venkatasubbaiyya (2) Kuppasāmayya (3) Patnam Subrahmanya Iyer (4) Kottavāsāl Venkatarāmayya
Gopālakiṣṇa	{ (1) Gopālakiṣṇa Bhārati (2) Inupachanigelu Venkatarāmayya
Bhādiagiri and its synonyms, Bhādiāchala etc	{ (1) Bhādiāchala Rāmadāsa (2) Rīmachandīa yatindra

In addition to the names already noticed, the following are the other itaranāma mudrakāras —

<i>Name of the composer</i>	<i>Mudra</i>
Sadāsiva Brahmdendra	Hansa or Paramahansa
Mārgadaṣi Seshaiyyangāi	Kosala
Sārangapāni	Venugopāla
Muvvalur Sabbāpati Iyer	Rājagopāla

Ghanam Sīnayya	Mannāṁṭuranga
Pallavi Gopālayya	Venkata
Vīrabhadrayya	Pratāparāma
Pallavi Duṛaisāmi Iyer	Subiahmanya
Kaṇṇan Rao	Narasimha
Vīdyala Nāṁṭyanaswāmy	Tirupati Venkatesa

Aṇṇagīrināthaḥ invariably concludes his Tiruppugazh hymns with one or other of the following forms Perumāle, Murugone, Tambirāne, Kumaravele

According to the number of mudras used, Bahumudrakāras referred to on P 138 may be classified into Dvimudrakāras, Trimudrakāras, Chatumudrakāras etc Thus Bhadrāchala Rāmadāsa will rank as a dvimudrakāra since he used the signatures, Rāmadāsa and Bhadrāchala or its synonyms Sundarāmūrti Nāyanār will rank as a Trimudrakāra since he used the signatures, Nambiyārūran, Arūran and Uran

Sometimes, vāggeyakāra mudras in conjunction with syllables or words preceding or following them furnish important meanings or internal evidence For instance the statement,

“Tyāgaiājuni brochina Sadguṇa rāyā!”

occurring in the song, *Sri Nāradamune* in Bhairavi rāga testifies to the fact that Nārada blessed Tyāgarāja

From the point of view of the number of mudras figuring in them, musical compositions may be classified into —

1) Eka mudra prabandha : e a composition containing only one of the dvādasa mudras,

Compositions containing the signature of the composer alone are instances. For example in the kriti, *Sriraghavarā-prameya* in Kāmbhoji rāga, we see only the vāggeyakāra mudra

2) Bahumudra prabandha i.e. compositions containing two or more of the dvādasa mudras

The Rāgamālīka, *Nityakalyāṇi* contains the rāga mudra and the vāggeyakāra mudra. This will be a dvimudra prabandha

The Kriti *Chintaya mā* contains the vāggeyakāra mudra, rāga mudra and kshetra mudra. This will be a Trimudra prabandha.

The *Chaturdasa Rāgamālīka* of Muthuswāmy Dikshitar contains the vāggeyakāra mudra, rāga mudra, prabandha mudra and the mudra of his patron. Thus this will rank as a Chaturmudra prabandha and so on

Svara sāhityas being additional and ornamental appendages to kritis, the mudra of a composer will not figure therein

The mudra charana i.e. the charana containing the signature of the composer corresponds to the tūnāmap-pāttu (திருநாமப்பாட்டு) and the tūukkadaikkāppu (திருக்கடைக்காப்பு). In this last stanza, the author besides mentioning his name, states the merit accruing from reciting the hymn

The presence of a vāggeyakāra mudra in a composition affords a *prima facie* proof that the composition is complete.

CHAPTER XI

Music and Temples

For many centuries, temples in India have been not only places of worship, but also seats of learning. Students pursued their studies under their Achāryas, in the holy precincts of temples in a spirit of reverence and devotion. Temples in the past also played an important part in the preservation and development of fine arts. Some of the best specimens of iconography, sculpture and architecture in South India are to be seen in her temples; and some of the best paintings, in her cave temples. Music in its triple aspect of gīta, vādyā and nṛtya (vocal music, instrumental music and dancing) was given a prominent place in temple rituals. From the *Kāmikāgamam*, one can see that the performance of music and dance in temples was not something optional, but an integral and compulsory part of temple ritual and worship.

Temples in South India particularly have played an important part in the preservation and development of music. In India, music and dance were never conceived of as mere items of entertainment, but as subjects worthy of serious study by even the greatest men and women of the land. These two arts were elevated to the status of *vidyā*. They helped the thinking men and women to understand something of the Infinite. It is not without significance that Divinities and Celestials are associated with music, musical instruments and dance. The performance of music and dance in temple rituals had a special significance. In temples one had the opportunity to witness rare specimens of sacred dance like

the Bhujangalalita nrittam, Ganapati nrittam, etc. Special musical forms like the Kaustubham can be heard only in temples.

The institution of music and dance in temples was conceived and planned in a spirit of offering to the Deity. In order to ensure a continuity of performance, the artists were in most cases given inams of land. There are instances of *Vinaiikkāni*, i.e., land given in perpetuity to vainikas by rulers in return for performances on the vinā during temple rituals. Many Saivite temples have Oduvārs who recite selections from the Tevānam during temple services. The Vaishnavite temples have the Arāiyars. The Veda-Pārāyana-Goshtis provide the hymnal music. From the 15th century onwards, bhajana as a special form of worship took shape. The bhakti movement of the medieval period gave a great impetus to this form of worship and the masses took to it with great fervour and enthusiasm. Bhajanas came to be performed in the temple precincts on Ekādasi and other sacred days. Men and women, old and young, all alike took part in this democratic form of worship, either as singers or as devout listeners. In fact, the Bhajana became the first introduction for the child to the realm of music.

The nāgasvaram party provided instrumental music in temples. Incidentally it might be mentioned that the correct name of this instrument is only nāgasvaram and not nādasvaram. The name nāgasvaram was possibly given to the instrument because its tone colour resembled that of the bhujanga svaram, the snake charmer's instrument. Muthuswamy Dikshitar himself in his song, "*Tyagarāja mahadvajāroha*" in Siniāga, relating to the festival at Tiruvārur temple has answered this question in a convincing manner.

We come across the words "*Nāgasvara maddalādi vādyam*" in the song, and the word *nāgasvara* here rhymes with the corresponding words, "*Agama siddhānta*" etc in the previous line. The *nāgasvaram* is not more than seven hundred years old. It is neither mentioned in the old works nor do we come across this instrument in the earlier sculptures. In the mural paintings in the Padmanābhapuram Palace, in Travancore, the *nāgasvaram* is depicted but these paintings belong to the late medieval period.

In some temples we hear special instruments being played during rituals. The *panchamukha vādyam* is the pride of the shrines at Tiruvāru and Tirutturaippundi, in Tanjore District. It is played solo and also in conjunction with the *suddha maddalam*. Pārasaivas are the privileged class of people entitled to play on this instrument. The present performer on this instrument in the Tiruvārur temple is a descendant of Tambiyappa, one of the disciples of the composer, Muthuswāmi Dikshitar.

The *panchamukha vādyam* is a five-faced drum with plain drum heads. This complex instrument belonging to the group of membranophones is of interest both from the musical and scientific points of view. It is a development from the ancient *Kudamuzhā* - (குடமுழர் a drum with a pot-shaped resonator) and familiar to students of Tamil literature. There is a fine sculpture of the *Kudamuzhā* in the Avadayārkoil. Arunagiriṇāthar in his *Bhūta-vetāla vaguppu* (புத்தேவதான் வகுப்பு) refers to the *Kudapanchamukhi* (குடபஞ்சமுகி). There is a sculpture of a figure playing upon the *panchamukha vādyam* in the stone *latham* facing the sanctum sanctorum in the Natarāja temple at Chidambaram.

The panchamukha vādyam has a big shell of bronze and from the tip of the shell emerge five hollow cylinders. The open ends of these cylinders are covered with skin. The drum heads are all on the same level. They are played by the two hands. The faces are struck successively and sometimes simultaneously. Special sequences of jātis (ஜதிகள்) are played on this instrument. The central face is slightly larger than the peripheral ones. The five faces are named after the five faces of Śiva - the central one bearing the name *Sadyojāta* and the four peripheral faces, *Isānam*, *Tatpuruṣkam*, *Aghoram* and *Vāmadevam*. Being a big and a weighty instrument it is mounted on a four-wheeled carriage. The tone colour of this instrument resembles that of the *tablā-tarang*. Since the instrument has a common resonating chamber, it follows that even when one face is struck, the other faces vibrate and this can be visually seen by sprinkling rice flour or particles of fine sand on the unstruck drum-faces. The notes heard are perfectly musical and the drum faces are appropriately enough, tuned to notes which bear the samvādi or anuvādi relationships.

Sarva Vadyam

Sarva Vādyam, literally all instruments, is an interesting institution by itself and is played only in a few temples. In the *Kāmikāgamam*, details relating to the rāgas, tūlas, pans (பண்கள்), instruments and dances to be performed in the nava sandhis during the Brahmotsava are clearly given. But it is a pity that even in the bigger and wealthier temples the archakas have lost touch with these details. In some temples, the appropriate slokas are recited at the concerned sandhis, but the question is whether the vocalists, instrumentalists and dancers do comply faithfully with the meaning of the sloka

When Gurjarī rāga has to be played, invariably the nāgas-varam player plays a light tune for the entertainment of those assembled, and when Bhujanga lalita nrīttam has to be performed, the dancing girl, if one is available dances something familiar to her. In this manner musical frauds are being perpetrated in the holy precincts of temples.

In the temple at Cheyyur in Chingleput district, the sarva vādyam is being played during the annual Brahmotsavam. Cheyyūr is also familiar to musicians as the place where lived the composer, Cheyyūr Chengalvarāya Sāstri in the last century. He has to his credit a number of kritis in Telugu and Sanskrit. He has also composed some sabdas.

The idea underlying the performance of sarva vādyam is musical homage to God in the triple aspect of gīta, vādyā, and nrītya. The function starts with the recital of selections from Tevāram, Tiruvāchakam, Tiruppallāndu, and Tiruppugal by the oḍuvāi and this is followed by pushpāñjali. The Nandikesvara vādyam (mīḍangam) and Brahmatālam are next played and this is followed by a nrīttam. Different musical forms, like gīta, varṇa, kīrtana, padam and tillāna, are sung and this is followed by the singing of literary forms like chūrnika, aṣṭaka, venbā, kalittogai, varieties of viruttam, amṁānai vāṇnam and ulā. The playing of different instruments like tiruchinnam, murali, mukha-vīṇā, takora vādyam, mallāri, dhanka, conch, navuri, bhujanga svaram etc follows. Items of classical dance and thematic dances like bhujanga nrītyam are also given. More than forty items figure in this programme. It is an education, an entertainment and a spiritual experience to witness the performance of sarva vādyam. The whole thing lasts for about three hours.

Dance dramas

Classical dance found its due encouragement in temples. The dancers performed before the Deity on special occasions. The performances of dance dramas and *kuiavanji nāṭakas* kept alive the art of dance. The Tiruvāim temple is noted for the performance of the *Pallaki seva prabandham*, a beautiful dance drama in Telugu by Shāhaji Mahārājah. The performances of the Bhāgavata mela nāṭakas in places like Merattūr, Sūlamangalam, Sāliyamangalam, Uttukkādu, Nallūr and Devapperumāl nallūr in Tanjore district enabled the audience to appreciate and understand the beauties of dance dramas.

The dance dramas of South India were an annual feature of the community life of the villagers. Almost all the adult members took part in them, either as actors, singers, or instrumental accompanists. Some looked to the stage management or green-room work and others to the general reception arrangements. In addition to the local people, large numbers of people from the neighbouring villages attended these dance dramas. As these dance dramas were enacted in front of the temples and in the immediate presence of the Deity, specially brought and placed at a prominent place in the direct view of the stage, a spiritual atmosphere was imparted to the whole show. In these villages it has been the custom for particular families to provide particular actors for these dance dramas. There have been instances when the right to appear in a particular role was even pledged by a person who was in need of money. Till the period of repayment, he denied to himself the privilege of appearing in

that role in the dance dramas. The dance dramas ensured the corporate life of the village, each one willingly sharing some part of the work.

Musical Stone Pillars

The musical stone pillars found in some of the temples are marvels of architectural and musical skill. The cluster of pillars carved out of a huge block of resonant stone was played upon with two thin sticks. The performers stood on opposite sides and played on the pillars. Solo music as well as accompaniment were provided by them. Rhythmic accompaniment was provided to performances of dance by playing jatis on them. The tone colour of the notes emanating from the pillars resembles the tone of the jalata-rangam. The pillars are of various artistic shapes cylindrical, square, octagonal, fluted, twisted etc. They show how art could be combined with the requirements of music. When a pillar is struck, one can feel and hear the sympathetic vibration from the other neighbouring pillars of the same frequency. The Pampāpati, Chowdeswari and Vittala shrines at Hampi and the temples at Lepāksi, Tādpatri, Madurai, Azhagarkoil, Azhwārtirunagari, Tirunelveli, Suchindram and Trivandrum contain splendid specimens of musical stone pillars. Where resonant stones occurred in plenty, they were used for carving resonant images as in the Krishnāpuram temple in the Tirunelveli District. In the temple at Dārāsuram, near Kumbakonam, the stone steps of the balipīṭam give musical notes. In the temple at Simhāchalam, notes are heard from the stone foliage work on the top of the pillars.

In the temples at Chempagarānallūr (செம்பகராநல்லூர்) and Āzhwārtirunagari (ஆழ்வார்திருநகரி) in the Tirunelveli District, there are holes drilled in granite stone pillars which

when blown through, produce the notes of wind instruments like the conch and the ekkālam. The air blown, passes through a scroll like resonating chamber inside the pillar and emerges on the other side. In the pillar near the *sanctum sanctorum* of the Vishnu temple at Āzhwārtirunagari, the note given resembles that of the conch. In the Siva temple at Chempagarānsallūr, in the Nānguneri Taluq, a further improvement is noticed. When one blows into the hole on one side of the pillar, the tone colour of the note heard, resembles that of the conch and when one blows into the hole on the opposite side, the tone-colour of the note resembles that of the ekkālam. It is a marvellous experience to listen to these notes. How the course of the air along one direction and the passage of the air in the reverse direction can result in notes of different tone-colour is a phenomenon worthy of investigation.

Musical Iconography

South India is the home of musical iconography. The beautiful images in stone and bronze and the paintings and frescoes depicting performers on musical instruments furnish valuable materials. Important inferences of both a negative and positive character are furnished by them.

The sculptures of Vinādhara Dakshināmūrti in some temples, the sculpture of Ashtabhuja Krishna playing the flute in the Varadarāja Swāmi temple at Kānchipuram, the sculpture of Sarasvatī playing a fretted vinā of the pre-Raghunātha Nāik period, in the temple at Pattisvaram, the images of Nartana Ganapati and Tāndava Krishna, the figures of trimly-clad girls playing kolāttam in cross wise posture in the temples at Perūr, Avadayārkoil, Tādpatri and

Rāmeswaram, the sculptures of celestial musicians in the Kumāraswāmy Temple at Cheyyūr and in the Anantapadmānābhaswāmy Temple at Trivandram, the sculptures depicting the different dance-poses with illustrative slokas beneath them in the Gopuram at Chidambaram temple, the musical inscriptions at Kudimiyamalai and Tirumayam in the Pudukottai State and the epigraphical records of ināms of land granted to musicians, found in some temples are all important materials and highly useful for research. The figure of a rishi playing on the yāzh on the wall of the *sanctum sanctorum* of the Vishnu temple at Tirumayam (Pudukkottai) is a sculpture of first class importance. Next to this figure is the figure of another rishi playing on a stringed instrument with a plain finger board. These sculptures belong to the 8th cent A D.

In the sculpture referred to above in the temple at Pattisvaram, the instrument depicted is the Rudra vīṇā, with two strings, two gourds and frets. The instrument is held in the horizontal posture unlike the oblique posture of the vīṇā in the earlier sculptures. With the disappearance of the yāzh, the vīṇā emerged as an important concert instrument. The head-piece of the modern South Indian vīṇā reminds us of the head-piece of the yāzh. The fact that the modern South Indian vīṇā with its hemispherical resonator on the right, the gourd resonator on the left, twenty-four frets, seven strings and the head-piece carved into the head of a yālī, is not found in any of the temple sculptures shows that this instrument came into existence after the period of these sculptures.

The Rāsamandalam depicted on the roofs of the kolumantapas in the temple at Gangaikondachozhapuram and

Kumbheswaraswāmi temple in Kumbakonam, shows how the process of deriving scales by the process of modal shift of tonic was explained practically by girls participating in pinnal kolāttam

Urdhva Tandava

The Urdhva tādava poses of Natarāja in the shrines at Peiūr and Thuvālangādu and in the gopuram of the temple at Tirumazhappādi offer interesting study. In addition to the usual damaru, there is an extra drum held between the legs by the Deity. One hand holds it and the other hand plays upon it. The explanation for this extra drum may be as follows —

In the Urdhva tādava, the Lord was developing a new type of dance unknown to devatas. In the earlier stages, He perhaps danced to easy and familiar rhythmic sequences and subsequently resorted to new and intricate patterns. The erstwhile accompanists were taken by surprise at the new type of dance. They stopped playing on their instruments. All that they could do was only to gaze with amazement at the thrilling performance of Natarāja. Finding that, in the absence of a proper rhythmic accompaniment, the significance of the new dance will go unnoticed, the Lord took an extra drum and provided the rhythmical accompaniment Himself. (Certain rhythmical syllables are produced by simultaneous strokes on both the faces of a drum. Since with the damaru, a stroke on only one side was possible at a time, the necessity for another drum arose.) Pārvatī who was responding to His dances with equal vigour and excellence in the earlier stages, became absorbed in the new tādava and the new sequences of rhythmical patterns. The

Urdhva tāṇḍava almost unneived Her She silently gazed at the thrilling performance Pāivati's failure to respond to the Urdhva tāṇḍava is popularly taken as Her defeat In fact there is an image in the Tiruvālangādu temple showing how in the initial stages of the Urdhva tāṇḍava, Pāivati even attempted to respond by partially lifting up Her legs

Ritualistic music and dance

In some temples like those at Tirupati, Bhadrāchalam and Trivandrum, great composers have composed special songs for being sung during the temple rituals The managements of these temples would do well to print these songs in notation and make them available to the worshippers It is time that the managements of temples appointed art curators who would look after the preservation of the art treasures of these temples

Temples in South India have been the home of *static music* and *dynamic music* and *static dance* and *dynamic dance* Representations of concert parties and dance parties through sculptures and paintings come under the heading, static music and static dance These records on stone and colour are valuable documents and help us to form clear ideas of the concerts of those periods, the number that constituted a concert party or a dance party, the instruments that were used as accompaniments, the construction and shape of those instruments, the number of their strings, finger holes and drum faces, the seating plan of performers etc The images playing on musical instruments and the sculptures of celestial musicians are interesting from many points of view The postures in

which the instruments are held, their manner of play, their compass and possibilities in gamaka are important details furnished by these specimens of static music. The costumes and jewels worn by dancers as depicted in the sculptures and paintings throw a flood of light on the subject of *ahārya abhinaya through the centuries*. *Dynamic music* and *dynamic dance* comprise actual concerts of music and dance performed in temples. Here we see the actual performers in life, flesh and blood before us and we listen to a continuous flow of music from them. The Vedapārāyana ghoshtis, oduvārs, arāyars, bhajana ghoshtis, concert parties and nāgaswaram parties provide dynamic music. The Vālmiki natanam performed on all full moon days in the shrine at Tiruvānmiyur, near Madras is of special interest. The deity is taken out in a palanquin. The bearers of the palanquin dance to quadruple time and triple time with remarkable precision and accuracy.

Temple music has got to be revived and revitalised. Steps should be taken to re-introduce the items of music and dance that were formerly given on the occasions of temple rituals.

CHAPTER XII

Geographical factors and music

A comparative study of the music of different countries will show that geographical factors have to a certain extent played a part in imparting particular traits to the music of the country. While countries occupying the lower rungs of the ladder in the scale of human civilisation have to their credit only folk music and folk dance, civilised countries have, in addition, developed art music and art dances.

A study of the music of different countries, may be made from the following points of view —

- (1) The quality of the music of the country—whether classical, light, martial, serious, frivolous, erotic or pathetic
- (2) The nature of the people generally speaking, whether they are artistic in their temperament and outlook, and whether they are a musical race
- (3) The place given to music in the scheme of national life
- (4) Places in the country which are at present active seats of music and places which were seats of music in the near past and remote past
- (5) The number of composers, musicologists, musicians and patrons that the country has produced

- (6) The status enjoyed by musicians and composers in society
- (7) The number of opera houses, concert halls, open-air theatres, musical conservatories and academies that the country has
- (8) The types of concerts preferred by the people generally in that country
- (9) The manner in which they have honoured their great composers and musicians
- (10) Materials used in the manufacture of their musical instruments

Such a study will reveal interesting facts

The political and economic conditions of the people of a country are truly mirrored in their national music. In countries which are situated in the midst of powerful and aggressive neighbours and which have in consequence been subject to continuous wars, we seldom come across a vigorous type of music. In countries more fortunately situated, we see a gaiety and vigour in their music.

In the continents of Asia and Europe, it will be found that the countries about the centre have a glorious musical heritage. Germany and Italy have to their credit a very large number of composers who have shed lustre on European music. The same is the case with India. Indians are perhaps the oldest musical peoples to inhabit this globe. The Vedic hymns constitute the earliest hymnal music of humanity. Music has always been given an honoured place in the way of life of the nation in India.

Seats of Music

Musically advanced countries have developed a number of seats of music. Eminent composers, musicologists, singers and artistes who specialised in the technique of playing particular instruments lived in those seats. They attracted to them the best musical artistes of the country.

Seats of music can be classified into those which owe their origin to —

- 1 Historical factors, and
- 2 Geographical factors

Rulers who were interested in music and rulers who were themselves scholars and performers patronised a number of musicians in their courts and such places became important seats of music. Munich and Vienna in Europe, and Delhi (during the reign of the Moghal Emperors and until the time of Aurangzeb), Rampur, Baroda, Bobbili, Vizianagaram, Karvetnagar, Venkatagiri, Tanjore, Pudukotai, Rammad, Sivaganga, Ettiyapuram, Udaiyarpalayam, Mysore and Travancore in India may be cited as instances. The city of Madras stands out as an instance of a seat of music, which not being the capital of a State and without any record for musical patronage, nevertheless grew in musical importance on account of its geographical situation and political importance. Madras lay on the ancient *Benāres-Rāmeswaram* route—the *Kāśhāta*. The shrines at Tiruvottiyur and Tiruvānmiyū, lying to the north and south of Madras were invariably visited by streams of pilgrims who came to the South. Eminent musicians and composers took up their residence in Madras from the 18th century onwards.

They had opportunities of meeting the musical luminaries who came to the south in the course of their pilgrimage. This capital and seaport town on the Coromandel coast attracted to it also men of commercial enterprise. Some of them amassed immense wealth by trading with the East India Company. Lovers of music like Manali Muthukrishna Mudaliyar, Venkatakrishna Mudaliyar, Pachaiyappa Mudaliyar and Kovur Sundara Mudaliyar lived in Madras during the 18th and 19th centuries, and lavished patronage on a number of musicians.

Places which were centrally situated and which had a favourable climate, a bounteous rainfall, a wealth of agricultural produce and facilities for leading a comfortable life also became seats of music. Such places provided opportunities for quiet thinking. The best musical minds of the country came into contact with each other in such places. Desert regions, mountainous tracts, barren places and regions subject to extremes of heat and cold never became seats of music. Places lying in the corner of a country continued to preserve the old characteristics of their music. They were not influenced much by the new movements in music which originated elsewhere. For the same reason, any new movement in music which originated in such places never made its influence felt beyond the districts on its borders. Travancore and portions of Malabar offer an interesting study in this connection. The scale of the *Nanduni* used in Malabar temples and instruments like the *Villadi vādyam* and *Vina Kunju* deserve notice.

People in colder countries are generally fond of listening to music of a heavy character. In Malabar, people listen with perfect composure, to the Chenda (drum) even when it is

played continuously for half an hour or more. But in Tamil nad, people would prefer to listen to the music of the nāgasvaram and tavil only from a distance. It should be pointed out that the pitch of the present day nāgasvaram is much less than that of the older one. The pipes used now are longer than those used in the past.

Musical Instruments

The types of resonant wood used in the manufacture of musical instruments are those which are locally available. Maple and pine are used in the manufacture of violins in Europe. Cocos wood is used for making European flutes, whereas the bamboo is used for the purpose in India. Bone-flutes were made use of in Europe in ancient times. The bamboo flute gives a delightful tone and it stands as the best example of a natural instrument. Unlike the European flute, the Indian flute has no detachable parts. One can perform on the flute music ranging from the simplest folk melody to the highest type of classical music. The conch is extensively used in the music of the temple rituals. There are conches which have a bright tone and conches which have a pathetic tone. The former type is used in temples and in martial music and the latter in funeral processions. Every warrior in the past had a conch of his own and he used it on the battlefield. The *Pāñchajanya* of Krishna and the *Devadatta* of Arjuna may be cited as examples.

Jackwood is largely used in the manufacture of the *vinā*, *tambura*, *gotuvādyam*, *mṛīdangam* and *kanjira* in South India. Sometimes blackwood is used for making *vinas*. Redwood is occasionally used for the shell of the *mṛīdangam*. Vizianagaram, Bobbili, Tanjore, Trivandrum,

Mysoore and Mīlaj are noted for the manufacture of musical instruments in South India. In the *Rudravāṇā*, *śītār*, *kinnari* and North Indian *tamburas*, gourds are used as resonators. The gourds are trained in their growth to the required shape. The snake charmer's pipe consists of a bottle-gourd and two pipes. Into the bulbous end of the gourd are introduced the two pipes, one serving as the drone pipe and the other as the tune pipe. The skins of calf, sheep, buffalo and monitor lizard (*varanus*) are used in drums. Silver, bronze, brass, copper and iron are the metals used in the manufacture of musical instruments. With the exception of the key board type of instrument and instruments with a fixed tone system (both of which were not of use in playing classical music of the melodic type), all other types of instruments have developed in India. There are as many as 500 varieties of musical instruments in India, the largest number that can be claimed by any single country in the world. The significant factors which localised the manufacture of musical instruments were the proximity of the requisite raw materials and the availability of local talent to examine and pass them as concert-worthy.

Jalatarangam is an old instrument and is referred to as the *udakavādyam* (water instrument). Playing on this instrument is included in the *chatushshashti kalās* (64 arts). Prior to the advent of the Chinese porcelain cups, metallic cups of varying sonorousness were used.

The bamboo stem is used in the *tuntina*, *kinnari*, *ektār* and *agappakkinnari*. Blackwood (உருது — *Diospyros ebenaster*) is used in the manufacture of *nāṭyasārin ottu*, *mukhavina* and *chiplā* (castanets). The mouthpiece of the

nāgasvaram consists of the leaf of a marshy plant and this functions as a double reed. The nāgasvaram corresponds to the oboe of the west. There is a stone nāgasvaram used in the temple at Āzhwārthunagari. It is of the length of a mukha vinā and gives a good tone.

Maddur on the Bangalore—Mysore line was once famous for the manufacture of metallic strings. With the import of the foreign strings, this industry received a setback. The recent war has however given a fillip to the manufacture of strings made of gut in India. Violin guts (D and A strings), are now being successfully manufactured in Vizianagaram. Metallic strings with twisted coils around them are made in the South. Strings of silken thread were made and used in swarabat.

India is the home of the earliest bowed instrument known to musical history. The hemispherical cocoanut shell was taken and covered with a skin. A bamboo stem was fixed in its side. A bridge was placed over the belly and over it two strings were made to pass. The ends of the strings were tied to two pegs on the top of the stem on one side and to the attachment on the cocoanut shell on the other side. A crude bow of horse hair was used to play the instrument. This is the Rāvanahastam or the Rāvanāstam referred to in ancient literature.

The head pieces of some of the Indian musical instruments are carved into the shape of an animal or bird. For example,

1. The head-piece of the vinā is carved into the head of a yāli (a weird animal).

2 The head-piece of the kinnari is carved into the head of a kite

3 The head-piece of the tāus is carved into the head of a peacock

4 The head piece of the svarabat is carved into the head of a parrot

There are also snake shaped horns and horns with a tiger's or lion's head. The *gomukha*, mentioned in the *Rāmāyana* and *Mahābhārata* as a wind instrument used in martial music, resembled the mouth of a cow. *Gosringa* was made of cow's horn and this is also mentioned in these two epics.

The ancient concert instrument of the Tamil land, the *yāzh* was classified into *pālai yāzh*, *maruda yāzh*, *kurinji yāzh* and *neydal yāzh*. This classification is suggestive of the regions where they were used.

Climatic Effects

Flutists in cold countries have to come to the concert hall at least 15 minutes ahead of the time scheduled for the commencement of a concert and be playing on their flutes in order that the warmth imparted to their instruments might restore their normal responsive character. In fact, in a concert hall in Europe, prior to the coming in of the conductor all the performers on instruments will be playing something or other in quick tempo, either for the above purpose or for getting into form. On the other hand in hot countries, there is the danger of perspiration which causes not a little annoyance to instrumentalists. As far as the flutist is concerned, the sweat

on the lower lip makes the embouchure of the flute sink in the lip to a greater extent than usual, with the result that the pitch of the fundamental note is slightly altered. He is therefore obliged to adjust each time and play cautiously.

In cold countries musicians are able to carry on their practices during day time, but in hot countries practices are mostly done in nights and mornings. Relatively speaking, European musicians are able to practice for longer hours than Indian musicians. In the case of professional performers in India, the pitch of the voice gradually decreases with advancing age. Climatic conditions are again responsible for professional performers in Europe being enabled to pursue their career for a longer number of years than their brethren in hot countries.

The fretting of the *vinā* will be a problem in cold countries. The fretting is done in India by the tuner sitting in the sun with the *vinā* in front. Due to the heat, the waxy ledge gets slightly soft and while in that condition, the frets are placed or re-set in their correct positions. After the fretting is over, the *vinā* is placed in the shade for the waxy ledge to harden. In cold countries, although the sun may be shining brightly, still the temperature is so low that the fretting of the *vinā* cannot be done in the manner indicated above.

Dance dramas (*yakshagāṇas*) are performed in the open air in India but this will not be possible in cold countries. There are open air theatres in places like Salzburg in Austria but such theatres are used only for a brief period during summer. The folk music festivals of India are held in the open air and during off seasons, so that the peasants may be enabled to participate fully in them.

The Musical Conservatories of Europe are housed in colossal buildings with double-walled, sound proof chambers. During a lesson or lecture-hour, the doors will be closed and even though a piano class may be going on in the next room, no one will get even a faint sound from that class. But in India it is futile to construct such buildings, because of the necessity for ventilation. The doors of lecture rooms here have to be kept wide open.

It is doubtful if women in tropical countries can reach the high notes of the soloists of Europe. Let it be remembered that the highest notes reached by sopranos in the west approximate to the tāra sthāyī kākali nishāda and the atī tāra sthāyī shadja of the normal pitch of women's voices in India.

Data from different countries may be collected concerning the following —

- 1 The age at which the voice breaks in the case of boys,
- 2 The period taken for the adult voice to set in, and
- 3 The behaviour of the voice during the period of transition

These data may help us to decide whether climatic conditions have anything to do with these physiological changes. The voices of girls also break sometimes and if data relating to this phenomenon also can be got, we can evolve some useful generalisations.

Miscellaneous

In all the countries of the orient it is the melodic system of music that prevails. The harmonical system had its birth in Europe a few centuries ago and has spread to America and countries which did not possess a developed system of music. Indian music stands as the perfection of the melodic system. Even now Indian music is the one system that uses quarter-tones. Scholars and musicians in India do not merely talk about quarter tones but they use them in their music.

In the matter of the geographical distribution of musical scales, it may be of interest to note that the scale of Sankarābharana (Bilāval of Hindusthāni music and the Major diatonic scale of Europe) is the most widely distributed. Next in rank comes the pentatonic scale, Mohana (C D E G A e'). Besides Indian music, this scale is found in Chinese music, Scotch music and Celtic music. The scale of Simhendramadhyama (57th melakarta, taking the notes C D E flat F sharp, G, A flat and B) is found in the music of the Hungarians and Gypsies in Europe. The scale of Suddha śaverī (Durgā of Hindusthāni music) C D F G A e' is found in the music of China, Indonesia and the Far Eastern Archipelago.

The mūrchhanās or the derivative scales of the primordial scale of Indian music (sa grāma), have their parallels in the ancient Greek and ecclesiastical modes and in the modes of the Arabs.

The seasons and times of the day or night mentioned as the most appropriate for singing particular rāgas are of special interest. Some rāgas can be sung at all times, while there are others which are intended to be sung before sunrise.

or after sunrise during midday or afternoon, and evening or night. There is no questioning the fact that the rāgas sung during their allotted times sound best, but the time-theory of rāgas generally speaking, may be said to be amenable. The Indian calendar recognises six seasons of approximately two months each, in a year and the six primary ragas Śrī, Vāsanta, Bhairava, Panchama, Megha and Nattanāyana were allotted to these seasons. The shadrutus or the six seasons are Vāsanta, Grishma, Varsha, Sara, Hemanta and Sisira.

The musical stone pillars adorning the temples at Hampi, Madurai, Azhagarkovil, Āzhwārtunagari, Tirunelveli, Suchindram and Trivandrum are the pride of South India. The like of them is not to be seen in other countries. These pillars are made of resonant granite. These stones may have iron in their composition. Wherever such stones were available, the temple architects made the fullest use of them. Both a musical and a rhythmical accompaniment were provided by these pillars. They were played upon with two thin sticks. There is a resonant boulder on the Chandi Hill slopes. Steps of resonant stone are found in the balipitam at the entrance to the temple at Dīvisuam, near Kumbakonam. In the temple at Krishnāpuram in Tirunelveli District, there are whole pillars of such resonant stones.

Musical Maps

Musical maps of India can be prepared on the following topics

1. Showing the seats of music—present seats and past seats. The relative density of each seat as shown by the number of musicians, musicians and composers that adorned those places, can be depicted with appropriate signs.

2 Showing the birth places of famous composers and musicians, also places which contain the samādhis or tombs of eminent musicians and composers.

3 Showing the places connected with the biographies of eminent composers

4 Showing the places noted for music festivals and the performance of dance dramas and folk dances

5 Showing places which contain sculptures and paintings of interest from the point of view of musical iconography and dance iconography

6 Showing places noted for the manufacture of musical instruments

The names of some rāgas in medieval and modern music suggest a provincial origin Kāmbhojī (from Cāmboja), Mālavi (from Mālwa), Saurāshtra, Gujjarī, Dīāvidā Gujjarī, Mahārāshtra Gujjarī, Suatī, Multānī, Āndhī, Turushka Todī, Nepālā Gauda, Sindhuhārī, Sindhukannada and Kalinga may be cited as examples

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